# The Builder.

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### *Small Country Houses.*

TO those who are sensible of the picturesque beauty of an old English cottage or farm-house, with its weather-stained walls, high roofs, low rooms and curious up-and-down arrangement of floor-levels, and its small windows which convey the idea of repose and retirement—to them the question naturally arises, why cannot we build small country houses now which shall have the same picturesque charm; shall contribute to the beauty of the landscape instead of defacing it, and have the same appearance of quiet and unpretentious homeliness?

The question is partly answered at once, to the effect that a considerable element in the charm of such old houses lies in the very fact of their age; they have been weathertoned into harmony with the landscape, and their old-fashioned peculiarities of construction have the interest of association with past times. But they were not built to be picturesque; they were fashioned according to considerations of structural convenience and the nature of the materials most easily come at.

In the book on The Modern Home,* edited by Mr. Shaw Sparrow, and of which the literary portion is furnished by Mr. Bidlake, Mr. Ricardo, and Mr. J. Cash, this position is admitted in the first page of Mr. Bidlake's opening chapter. The charm which haunts these old houses, he says, is not due to Nature and human association alone, but to the fact that it was the direct outcome of an attempt to satisfy the needs and manner of life of its former inmates; that the rooms were grouped together as we find them, partly because it was the customary and traditional way of planning such houses, partly because the planning had slowly changed from age to age with the conditions of life. Agreeing with all this, one may put the question, how are we to proceed so that the country houses of the present day may have the like charm for those of a later century? The same charm for ourselves the houses of the present day cannot have, because the element of antiquity and association is wanting and cannot be manufactured; their interest for future generations would surely lie in our building them with the best materials and the best methods of to-day, and planning them in the manner best suited to our present-day requirements and mode of life.

But this is just what the architects who are specially desirous to produce picturesque country houses seem to shrink from. In the book before us, which contains a large number of designs and plans of modern country houses, and which is obviously intended to suggest how these should be built so as to be pleasing and picturesque in appearance, there appears to be, nevertheless, a continual attempt to imitate the exterior proportions and treatment of houses of two or three centuries ago, rather than those which modern everyday conditions would lead people to build if they were unfettered by archæological precedent. The plans, it is true, represent for the most part what is required by modern habits of life (though there are practical oversights in some of them); but most of the exterior elevations represent what we should take to be old houses if we did not see them in modern drawings and photographs. Most of them have very high-pitched roofs, which is an economy in walling, but means inconveniently shaped rooms in the upper story, in the case of a two-storied house. Many of them have very small windows, which have a pleasant, old-fashioned appearance on the exterior; but to have windows too small is as great a mistake for health and comfort as to have them too large. No doubt the average English houses of the last half century had windows much too large; but this is not exclusively a modern mistake; it was the same with the large Jacobean and Elizabethan mansions, "so full of glass that one cannot tell where to become to be out of the sun or cold," as Bacon noted in his Essay. In Mr. Bidlake's "House at Winscombe, Somerset," it is noted that "the walls are of solid timber and concrete resting on a base of stone." Mr. Bidlake is justly satirical on the absurd superficial imitation of half-timber work by planking affixed to a brick wall and plastered between (he surely exaggerates when he says "½-in. planking"); this

* "The Modern Home: A Book of British Domestic Architecture for Moderate Incomes." The text by W. H. Bidlake, M.A.: Halsey Ricardo; and John Cash. Edited by Walter Shaw Sparrow. London: Hodder & Stoughton.

house is built (above the stone base) of solid timber filled in between with concrete; but is this construction dictated by economy or by special circumstances? We should hardly think so; it seems rather to arise from the desire, as a matter of sentiment, to revive an old style of building. There is no objection to doing that; but it is not following the lead of the old builders, who used timber construction on occasions when it was cheapest and most convenient, not for reasons of sentiment. Then as to the question of brickwork, in regard to which Mr. Bidlake expresses himself strongly in contempt of the aim of the modern brick manufacturer to produce bricks "as exact in shape, as sharp in arris, as smooth in surface, as uniform in colour, and as bright a red as it is possible to make them"—except in regard to the last item, we hold that for town buildings, which are seen amid artificial surroundings, such clean-cut and finished brick work is the best; that it is unnecessary and out of place in a country house, unless in a stately type of mansion, we concede. But as to the desire for much thinner bricks than are at present used, does that coincide with the best practical conditions? With bricks the same length and but half the thickness of the modern one, that means double the number of joints, and double the labour in laying; is that practical, or is the result worth the increased labour and cost? The present accepted shape of brick is certainly not the best for appearance, but it has the practical advantage that it is just about the weight that a man can easily handle with one hand. If it were possible to get the normal shape of the brick revised, with the concurrence of the makers (it would probably require an Act of Parliament, however, to do it), the best result would be to have a brick of a different shape, but with the same weight and substance. A brick of 10½ by 5¼ by 2¼ in. would be very nearly the same contents as the present brick (only 2½ cubic inches more), with a more agreeable proportion, and the reduced number of vertical joints would nearly balance the increased number of horizontal joints in the laying, with the advantage that a single brick wall would be 10½ in. instead of 9 in., which latter is really too thin for an outside brick wall, though it has been accepted since the cheap cottages movement began. A 2-in. brick (which seems to be what is contemplated in this book) is in our opinion rather too thin for the best effect, and to use a brick of the present length and only 2 in. thickness is to make a great increase in bricklayers' work without a corresponding advantage. And to do this is not to work in the spirit of the old builders. They built with the brick which was in habitual use in their day. It would never have occurred to them to have a special brick made in order to give their houses the effect of those of another period. That is a matter of sentiment, not of practical building.

With some of Mr. Bidlake's observations we are entirely in sympathy. "The contract system of carrying out building operations, in which each builder strives against his fellow to execute the work as cheaply as possible without reducing his own margin of profit, is a direct discouragement to good work." It is indeed, in large buildings as well as in small country houses. Why is it that one is so struck, in measuring old houses, with the thick walls and deep reveals, the generous and liberal scale of the construction, in comparison with the starved and just-enough proportions of the same details in modern houses? The difference is all the effect of the contract system, which is the bane of modern architecture; and is not only a discouragement to good work, but an encouragement to dishonest work. When the highest tender for a house is, say, about 5,000*l.*, and the lowest somewhere about 3,000*l.* (and differences to that extent are quite common in our "Tenders" column), it is obvious that the work which one responsible builder valued at 5,000*l.* cannot be getting truly and honestly done at 3,000*l.*, unless the contractor is actually to work at a loss. In regard to the remark as to the natural manner in which an old house seems to adapt itself to the site and to the levels of the ground, the result of its being to a great extent laid out and planned on the ground, Mr. Bidlake's advice, that "the modern architect, if he is wise, will scheme the main lines of his building whilst visiting the site, and while he is under the influence of its character and surroundings," ought to be entirely superfluous; it is mere common sense, in fact. How can a house be really suited to a site unless it is planned in direct reference to the site? But it is the client himself, very often, who cannot see this, and who will ask for a sketch of a house with a certain stated accommodation, without understanding that the architect wants (or ought to want) to see the site before attempting to put the house into shape, even in a sketch form.

Mr. Bidlake's essay deals with "The Home from Outside," Mr. Ricardo's with "The Interior and Its Furniture." With most of his essay we are quite in agreement, in theory; there are sometimes difficulties in practice. It is quite true that the bulk of furniture to-day is made to suit all tastes, and that furniture which is made to suit any position will often not suit the particular position in which it is put; but to have furniture made for the room and the position is a counsel of perfection which demands a longer purse than most builders of small country houses for their own occupation can draw upon. That rooms are often far too crowded with furniture; that pieces of furniture are often made inconveniently and unnecessarily high, "with no justification beyond the common experience that the purchaser cannot get properly proportioned pieces"—these are points to be borne in mind; also, we may add, that every piece of furniture should be capable of being easily cleaned and "dusted" on the top. Of course, if the owner is essentially a literary man with a large collection of books, he will not be able to get his books stacked without having bookcases up to the top of the wall, with a movable step-ladder for getting at them; but where books are only kept in moderate numbers, a long low bookcase is much more practical and convenient, and looks better, than a high narrow one. Where the books are numerous, and if the house is in permanent possession, it is better to make the bookcase a permanent fixture carried up to the ceiling, instead of leaving a dust-collecting space on the top. We do not notice any remark on the unnecessary height of living-rooms in comparatively small houses; a comparatively low sitting-room both looks and is more comfortable to live in than an unnecessarily high one. A remark as to the difference in the function of the staircase in town and country houses draws attention to a point often overlooked:—

> "In a town house, as a general rule, the lower flights connect the downstairs sitting-rooms with the drawing-room on the first floor; people go up and down these flights in pairs, arm-in-arm; the staircase is thus the introduction to the principal room of the house, and it is important that it should play up to its rôle, and make a good impression in the doing. But in the country the sitting-rooms are generally all on the ground floor, and the staircase leads only to the bedrooms. Instead of being the feature on entrance, it really should be quite away from, or at least out of sight of, the front door. Very often there is only one stairs for all the service in the house [though that is bad planning unless it is a very small house], and it is desirable to keep the engineering and manipulation of the house as unobtrusive as possible. The stairs must be handy to the principal bedrooms, within sight of the spare room, and one's visitors must be able to reach the sitting-rooms without having to cut across the service traffic. A convenient staircase should fulfil all these requirements."

To the further remark that boxes have to be taken up and down the staircase, so that it is not to be starved in width or planned as a corkscrew, we would add that a hand-worked luggage lift, with a rope and pulley, might often be got in with a little management, and would be a great boon, especially where there are only women servants, who would thus be saved the penalty of struggling upstairs at the two ends of a large and heavily-packed trunk or portmanteau.

The two chapters on the very different subjects of "Some Decorative Essentials" and "Sanitation" are by Mr. John Cash. On them we have not much to say; there is nothing in the "Sanitation" chapter with which we disagree; we would only add that a small refuse destructor somewhere in the grounds is a very desirable addition to the machinery of a country house. In regard to baths, perhaps he is right in suggesting the cast-iron enamelled bath as the best combination of appearance and economy for the small country house (if makers would only make them with plain supports instead of those wretched "ornamental" feet!); when he recommends "a large outlet and waste pipe" surely he might also have stipulated for a large supply pipe; most house baths take nearly ten minutes to fill; and it may be added that most of them are not large enough. And we do not agree in recommending "the old-fashioned plug and chain" for the waste; the chain is apt to get in the way. Nothing is said about water-supply—one of the most important and sometimes most difficult problems in connexion with a country house.

Now, to come back to the central interest of the subject—the planning and architectural treatment of the country house, and the large number of designs illustrated in this book. A great many of these—most of them in fact—are charming in a sense; but they are too archæological, too much permeated by

an endeavour to re-create the picturesque of a past day. The fact that it is perfectly easy nowadays to make a house with a flat roof is not even referred to. High-pitched roofs are not practical building for modern days; and the idea that they are especially pleasing in appearance is a matter of a habit and association. We do not say that we desire to see flat roofs as a general treatment of country houses, though there are occasions when they might very well be used (especially with stone houses); but they should at all events be recognised as one form of roofing. On the other hand, we doubt whether thatched roofs ought to be recognised as a modern system of roofing. They look very picturesque on old cottages; we should hesitate to recommend them for new ones. The "Row of Thatched Cottages" by Mr. Lutyens, shown in a coloured double-page elevation and plan, with its very small windows and very high roof, at once suggests that it is a coloured sketch of an old group of cottages. As such it would be charming; as a modern set of cottages it is an anachronism; and it must be remembered that while you can make these things look like old work in a drawing, you cannot make them look so in reality. The windows in this design look too small for either comfort or health; their exact size one cannot judge, as there is no scale to the drawing. We observe also that a number of the plans in the book have no north point, which looks as if those who planned them had not realised the very important bearing which the aspect of a room has upon its comfortable occupation at special times of the day. We find several plans with dining-room, hall, and drawing-room all with the same aspect; this must be wrong at any rate, whatever the aspect, which there is nothing to show. In one plan by Mr. Voysey we find kitchen, larder, dining-room, hall, and drawing-room, all with their windows in the same wall and fronting the same way, and the pantry so placed as to be the only passage way from the kitchen to the hall, and with a door opening out of this pantry-passage right into the dining-room, in the centre of the end wall of the room. This is one of the most crude plans we ever saw, and this is by an architect who is supposed by many people to represent the most artistic development of the architectural treatment of the small country house. That is what we complain of in the case of so many of the architects who specially aim (and not unsuccessfully) at the picturesque—they make such unpractical plans. In the house which one architect has built for himself we see the dining-room lighted by one large window facing south, and the kitchen by a large window facing west. In winter it does not matter; we have never too much sun at any time of the day then; but on a hot day in summer a south-lighted dining-room is very uncomfortable for lunch, and a west-lighted kitchen very uncomfortable and hot when cooking the dinner. In Mr. Bidlake's small "House at Winscombe," before referred to, there is a good idea in the shape of a "dining annexe" opening out of the living room, with permanent seats round three sides of the bay (the *tridinium* in a modern form); and there is another point in it—an "invalid sitting-room" with a large bed recess opening from it; probably the house was planned for special circumstances. The windows, however, must be exceedingly small; there is neither scale nor north point (an extraordinary omission in an architect's drawing), but from the information that the house is 64 ft. long over all we can estimate the sizes. The omission of scales in this and some other drawings, however, suggests that the authors were rather afraid of their dimensions being tested. The editor of a book like this ought to have noted this point, and demanded scales; elevations and plans without scales are absurd. In some of the plans of small cottages there is a want of sanitary care in the placing of the water-closet or earth-closet. In the first plan we came to, for instance, the earth-closet opens *within* the house and facing the scullery-door; it would have been quite easy to place the window in the rear, and the door outside, where the window is. The same applies to "Cottages at Ripley" (by the same architect), and to one or two others of the small plans. In the case of cottages with two or three rooms close together, it is really necessary to keep the entries to earth-closets outside the house, if they are not to be a nuisance.

Among the larger houses the best plans are those of Mr. Arnold Mitchell, and Mr. Brierley's "Shooting-Lodge in Yorkshire." There are many picturesque exteriors illustrated, but the impression produced in turning them over is that we have been looking at a series of views of old houses. The architects may say that that is the best compliment they could have; but we cannot agree. It is quite possible to make a house design picturesque and interesting without making it look (on paper) as if it had been built two or three hundred years ago. Mr. Lutyens's "High Walls, Gullane, N.B.," gives exactly the notion, in the illustrations, of being an old XVIIth century farmhouse of the larger class. But "Monkton, Singleton," by the same architect, has no such appearance; it is an entirely modern design and a very interesting one, and is one of the best things in the book.

Mr. Bidlake, in his chapter, remarks on the difference of the conditions under which houses are built now, compared with the time when the architect simply furnished the general design, and the full-size details were elaborated by the master-masons themselves within the limits of the general drawing. Now "the architect dominates him (the workman) in every way, and leaves the peculiar impress of his thought on every detail." And he goes on to remark how different this is from the "greater freshness and variety" which used to be attained when the genius of traditional art and craft was still existing. Different—yes; but not necessarily inferior. That state of things does not exist now, and it is no use acting as if it did. That is what those are doing who are designing these high-roofed houses with a picturesque irregularity of outline, as they would have been when houses were put together in a naïve and unconscious manner.

In short, we would see the modern country house treated as a work of art, not of archæology.

## SIR BENJAMIN BAKER.

BY the sudden death of Sir Benjamin Baker one of the greatest engineers the world has ever seen has passed away, but his works will live for many centuries, and his reputation will probably be even more lasting.

Sir Benjamin, the son of Mr. Benjamin Baker, of Carlow, was born in 1840, and his death, which took place on Sunday last at the comparatively early age of 66, was the result of syncope.

Like most other engineers who have risen to eminence, Sir Benjamin Baker went through a course of practical workshop training, having commenced professional life in a South Wales iron-works, whence he passed as an assistant into the offices of the late Sir John Fowler, with whom he was afterwards more closely associated in the capacity of partner. Always a student, and gifted with keen perception, he took ample advantage of every opportunity for applying the teachings of science to the varied problems encountered in the course of daily work. Sir John Fowler was an engineer of great skill, experience, and self-reliance, whose example could not fail to be of the greatest benefit to the kindred spirit who entered his office some forty years ago.

Much of the work done by Baker in the early stages of his career is hidden beneath the ground or overshadowed by the name of his former chief. The time in question was one of preparation for greater works to follow in due course, and for the more independent career that commenced a few years later. But in papers read before engineering societies and in literary contributions to the technical press there was ample indication of the qualities that were destined to earn for their owner a world-wide reputation.

Sir Benjamin Baker's professional career was largely associated with the history of Metropolitan railways and other important undertakings embodying engineering work of the most varied description. For structural iron and steel work he possessed unusual aptitude, one example of which was given by his design of the vessel in which Cleopatra's Needle was brought from Egypt to this country, and a subsequent proof of the manner in which he had profited by study and practical experience was afforded by the publication of his treatise on "Long-Span Railway Bridges," a work widely known in America and on the Continent as well as in Great Britain.

His connexion with irrigation works in Egypt dates back to the time when Sir John Fowler was employed by Ismail Pacha to design irrigation schemes on a gigantic scale, and to prepare drawings for a waterway from Alexandria, *viâ* Cairo, to the Red Sea as a rival to the Suez Canal.

Many years before the Forth Bridge scheme took actual shape Sir Benjamin Baker had fully considered the applicability of the cantilever principle to modern steel bridges. At a meeting of the Institution of Civil Engineers he

quoted the case of an ancient cantilever and central girder bridge in Tibet, and the proposal made early last century for the construction of a cantilever bridge across the East River, New York, and cited the Dal River railway bridge in Sweden, whose cantilever arms were built outwards without the aid of staging. Being convinced that this principle was good, he prepared details for a cantilever double track railway bridge of 1,700 ft. span, and advocated the adoption of the system for long-span bridges.

By the lamentable disaster to the Tay Bridge in 1879 he was afforded an opportunity of putting his ideas into practice on a grand scale. At that time preparations were in progress for building a suspension bridge over the Firth of Forth, in accordance with plans prepared by Sir Thomas Bouch, but the wreck of the Tay Bridge at once threw doubts upon the safety of the project, and the works were abandoned. In February, 1881, the four railway companies interested requested their consulting engineers, Messrs. T. E. Harrison, W. H. Barlow, J. Fowler, and B. Baker, to consider the feasibility of bridging the Forth, and the most desirable type of bridge for adoption. The result was the unanimous recommendation of the cantilever principle, thus completely vindicating the opinions long before advanced by Baker. When the design had been finally settled by the four engineers named its execution was entrusted by the associated railway companies to Messrs. Fowler & Baker. There is no doubt that the lion's share of the work fell to the subject of this memoir, who, however, was always ready to acknowledge the co-operation of his former colleagues, and notably the valuable assistance of Sir John Fowler, in the arduous work of overcoming the enormous difficulties attending the actual construction of the bridge, on the opening of which Sir Benjamin Baker was created a K.C.M.G. by the late Queen Victoria.

In addition to the bold engineering design and true art characterising that great structure, the Forth Bridge stands a monument to the indefatigable labours of Sir Benjamin Baker as an experimentalist. Convinced by previous investigations that no engineer should rely upon steel which he had not rigidly tested, he carefully examined all material delivered upon the site of the works, and conducted elaborate tests with the object of determining the reliability of the metal. The intensely practical side of his character, of which this is but an isolated example, is one that may escape the general eye, but deserves to be widely known, for in no small measure it is responsible for the unbounded confidence that has justly been reposed in Sir Benjamin Baker by engineers and the public alike. While ever ready to attack a novel and difficult problem, if need were, with a bold solution, nothing was left to chance, either in the design or in its subsequent realisation.

Next to the Forth Bridge the most prominent work in this country with which Sir Benjamin became associated during recent years was the development of the tubular railways in London—a branch of engineering for which he was specially qualified by long experience as the assistant and partner of Sir John Fowler. The splendid systems of underground lines, which have done so much towards the solution of the great traffic problem, probably owe little less to the confidence inspired by the name of Sir Benjamin Baker than to his unrivalled constructive genius. Although hidden from view, these works are not likely to be forgotten, but there are many others in the Metropolis and all over the country where the great engineer, acting in a purely consultative capacity, has been content to remain entirely in the background. Yet the successive engineers of the London County Council and other public bodies have good reason to entertain grateful remembrance of the help afforded in times of difficulty. In fact, to one and all he was a rock of strength and a sure defence in the hour of trouble.

No one would like to suggest that Sir Benjamin never made a mistake, but it may safely be said that there are very few men who have been able to point to an error of judgment on his part in constructive work. The only case of the kind within our knowledge is one in which a difference of opinion arose between him and a young engineer as to the safety of a somewhat important bridge built some thirty-five years before from the designs of Sir Thomas Bouch. Instead of succumbing to the verdict of his eminent *confrère*, this pertinacious young man stuck to his point, obtained permission to make a systematic examination of the structure, and finally induced Sir Benjamin Baker to agree with him that the bridge must be rebuilt. We would not mention this incident were it not for the fact that the sequel redounds to the credit of the engineer who was thus crossed by one of far lower professional standing and much his junior in respect of age. Untouched by any feeling of passing resentment, and recognising the fact that here was a man of ability and courage after his own heart, Sir Benjamin extended the hand of friendship to his erstwhile opponent, and ever after held him in kindly remembrance and esteem. This is only one instance of many that could be cited, showing that a true and manly heart was to be found beneath an exterior which some not well acquainted with Sir Benjamin Baker may possibly have thought somewhat cold and repellent.

Without underrating the part played by Sir William Willcocks in the design of the Assuan Dam, it may safely be said that in his capacity as a member of the International Commission and afterwards as consulting engineer to the Egyptian Government, Sir Benjamin Baker rendered most valuable services in settling the form of design and the sectional dimensions of the dam, and also by his advice and supervision during the execution of the works. With his usual care for stresses due to temperature changes, he willingly accepted the cross-sectional dimensions, suggested for a different reason by another member of the International Commission, and approved the design finally prepared by Sir William Willcocks, which has rendered possible the raising of the dam to the originally contemplated height with a comparatively small expenditure. Whether Sir Benjamin shared the anticipations of Sir William Willcocks in this respect we shall never learn, but from what we know of his shrewd foresight it is very probable that he did, although having the wisdom to keep his own counsel on the matter. The actual work of raising the dam after the progress of erosion of the river bed had been effectually checked is another matter in which the advice of Sir Benjamin proved of the utmost value. This operation is one requiring the most careful consideration of the relative expansion in the new and the old masonry, and, as publicly stated by Lord Cromer and Sir William Garstin, the solution of the problem found by Sir Benjamin Baker is one that fully deserves the grateful recognition of Egypt. As our readers doubtless remember, Sir Benjamin Baker was created K.C.B. on the opening of the Assuan Dam in 1902. At the same time he was made a member of the order of the Medjidie by the Khedive.

In the United States Sir Benjamin Baker was almost as well known as at home, and his services have been retained in connexion with many important engineering works in that country. Ever ready to risk his life at the call of duty, he narrowly escaped death while inspecting the once-derelict Hudson River Tunnel, between New York and Jersey City. The son of the chairman of the company had descended with Sir Benjamin, and the prolonged absence of the two explorers—who were unable to re-enter the air lock owing to the inefficiency of the air-compressing plant—caused such alarm that after much trouble and delay additional air-pumps were procured and the prisoners were finally released.

As an instance of his self-devotion at home, we may recall the promptitude with which he responded to the call when the roof of Charing Cross Station had partly fallen, and the remainder was in a hazardous condition. Without hesitation he took the risk of making a personal inspection of the damaged roof so as to be able to decide upon the best measures for averting the risk of further collapse. As we know, the temporary measures taken had the desired effect, and upon his advice the old roof was ultimately removed without accident or mishap of any kind.

Early in his professional life Sir Benjamin Baker appreciated the fact that there is a distinction between engineering construction and architectural design, and he wisely abstained from the endeavour to make his structures look "ornamental." In the Forth Bridge he has given to the world and to engineers a magnificent example of design, relying for effect solely upon its majestic proportions and appropriately significant lines. We have tried for years past, but with comparatively little success, to persuade engineers that their customary straining after decorative effect is a mistake, and the result nothing but bad taste and the defacement of good work. In this, as in many other respects, Sir Benjamin Baker set an example worthy of being followed.

For forty years Sir Benjamin was associated with the Institution of Civil Engineers, which he joined as an associate in 1867, being elected a full member in 1877, afterwards becoming a member

of council and a vice-president. In 1895 he was elected president, and since that year has remained an active member of the council. In 1890 he joined the Institution of Mechanical Engineers, and was a member of council at the time of his death. In 1894 he was elected a member of the Institution of Electrical Engineers. As a recognition of his scientific attainments he was made a Fellow of the Royal Society in 1890, the honorary degree of LL.D. was conferred upon him by the University of Edinburgh, the honorary degree of D.Sc. by the University of Cambridge, and the honorary degree of Master of Engineering by the University of Dublin. Among other recognitions of his genius we may mention the award of the Poncélet prize by the French Academy of Sciences, and honorary membership of the American Societies of Civil and Mechanical Engineers, and the Canadian Society of Civil Engineers. He was a consistent supporter of the work carried on by the British Association and the Royal Institution.

Honours and compliments naturally pursue those who have done great things, but the highest distinction for a professional man is the record of his work. The career that raised Sir Benjamin Baker to so high a place in the esteem of engineers all the world over deserves to be told in full, for the benefit of the present and succeeding generations of those who have entered or are about to enter the same profession.

## NOTES.

**Labour Returns.** THE improvement recorded in the state of the building trade last March has, according to the latest returns published in the *Board of Trade Labour Gazette*, but slightly continued in April; it appears to be nearly confined to a seasonable improvement. The general returns given by the trade unions still show a general improvement, the percentage of unemployed being 3·3, as compared with 3·7, and wages show an average advance of 12,000*l.* a week. Trade disputes show an increase; thirty-nine new disputes commenced in April, as compared with thirty in April last year, and the number of workpeople affected by disputes new and old was 15,586, as compared with 12,712, and the duration of the disputes amounted to 148,500 working days, as compared with 128,500.

**Our Post Office Buildings.** IN a letter in the *Times* of Friday last week Mr. Sydney C. Cockerell drew public attention (in connexion with a Parliamentary debate on the Post Office) to the poor and commonplace character of the Post Office buildings erected in various towns all over the country; a subject on which we have many times commented. These buildings are typical of official architecture; they are (in the case of the more important ones) examples of what are called "handsome buildings," erected at some cost and in a kind of correct conventional style, but wholly destitute of architectural interest or character. As Mr. Cockerell said, an opportunity is given to the Post Office of setting an example of good and reasonable architecture throughout the land, as the late School Board for London did in its London schools; but it dispenses nothing but architectural commonplaces, the style of which affords a strong argument in favour of the views of those who have recently raised such strong objection to the carrying out of buildings by the official salaried architects of public bodies. In France, where new post offices are constantly in course of erection, these are carried out by eminent architects from the general ranks of the profession, and are not unfrequently the subject of competitions. In England they are all turned out of the official architectural mill.*

**Concrete Bridges in Bavaria.** WITHOUT entering upon the relative merits of different structural materials, we refer here to three railway bridges with spans of 187 ft., 211 ft., and 211 ft., respectively, which have lately been erected in plain concrete on the three-hinged principle. All of these structures were designed by Mr. Beutel, Chief Engineer to the Bavarian State Railways. One of them, at Lautrach, crosses the River Iller, with a main arch span of 187 ft., and two smaller arches at the abutments. As the rise of the main arch is only about one-sixth of the span, the three-hinged system is particularly advantageous. The arch rib in this instance carries cross walls connected by small arches surmounted by the road upon which the permanent-way is laid. The two other bridges cross the River Iller close to Kempten station, where there is a network of several branch lines. One of these bridges carries four railway tracks, and the other only two, but their structural features are practically identical, the main arch of each bridge having the clear span of 211 ft., with the rise of about four-ninths of the span. We are glad to say that all three bridges were finished without the casing of stone or other veneer which some engineers seem to imagine is necessary for decorative effect. It is stated that the cost of the Lautrach bridge was 17 per cent. less, and the cost of the two Kempten bridges was nearly 20 per cent. less than the estimated cost of steel bridges. The ultimate saving should be considerably more, owing to the fact that practically no maintenance is necessary in the case of concrete structures.

**Proportioning Concrete.** A PAPER of exceptional value on "The Laws of Proportioning Concrete" was read before the American Society of Civil Engineers last month by Mr. William B. Fuller and Mr. Sanford E. Thompson, two well-known authorities on the subject. This contribution contains details of tests undertaken at the Jerome Park Reservoir works to ascertain the effect of different aggregates on the density, strength, and permeability of concrete, and particularly to determine the exact sizes of aggregate which with given proportions of cement would form the best concrete. In this note we cannot possibly discuss even a tithe of the results quoted in a paper extending over nearly eighty pages of letterpress, and we can only refer very briefly to a few of the chief conclusions derived therefrom. Aggregate of large size was shown to yield the strongest and densest concrete, gravel producing concrete denser, if used with sharp sand, and stronger than that made with broken stone of equal size. A very important point made clear was that by specially grading the particles of aggregate so as to give a mixture of maximum density the quantity of cement could be reduced by about 12½ per cent. without reducing the strength below that of concrete made with aggregate in the natural state. It was found also that the strength and density of concrete was affected more by variation in the size of the sand particles than by variations in the size of the aggregate. From these and similar results the authors deduce the general very important law that the correct method of proportioning concrete for strength is to find, with any percentage of cement, a mixture of maximum density and then to increase or decrease the proportion of cement by substituting it for the fine particles in the sand, or *vice versâ*. This theory, however, cannot be definitely accepted unless confirmed by further investigation. The authors found that gravel concrete was less permeable than stone concrete of any kind, a point that deserves to be borne in mind by users of concrete-steel.

**Timber Poles for Overhead Electric Cables.** ALTHOUGH electricity can be generated at low cost, it can only be distributed at advantageous rates over large provincial areas by the adoption of overhead mains, such as are extensively used on the Continent and in America. The first supply corporation to introduce overhead cables for high-tension transmission in this country was the Lancashire Electric Power Company, their example having been followed by other companies until at the present time the total length of overhead mains amounts to some fifty-five miles. Of course, this is a very small total as compared with the figures afforded by other countries, but it marks, nevertheless, the beginning of a movement that will ultimately prove of much value, especially in tending to check the steady flow of population into already crowded centres. Overhead power transmission lines in Great Britain have hitherto been erected more or less by rule-of-thumb methods, as no reliable data were available for determining the requisite strength and size of the poles employed. With the object of throwing light upon these points two exhaustive series of tests on timber poles have been conducted by Mr. C. Wade, with the co-operation of Professor Goodman, of Leeds. Recently Mr. Wade gave a full account of his tests in the form of a paper read to the Institution of Electrical Engineers. One series of tests, carried out in August, 1906, proved very clearly the marked superiority of "A" poles over single poles, and that to obtain the requisite strength poles of the latter type would have to be of such diameter as to make the cost prohibitive. Consequently, in succeeding tests attention was devoted chiefly

* Are the post offices in Ireland carried out on the same system? In the small town of Westport (Mayo), which we had occasion to visit a year or two ago, we noticed that the local post office was a building of remarkably good and picturesque character; it was certainly not turned out of the same mint as the English post office buildings.

to the strength of "A" poles and the most suitable method of construction. In the second series of tests, conducted in December, 1906, it was found (1) that whereas a single pole would often deflect to a serious extent before breaking, an "A" pole would only deflect a few inches, and would sustain in a direction across its two members, or perpendicular to the transmission line, a load equal to four or five times that which could be borne by a single pole of equal cross-sectional area; and (2) that an "A" pole was at least twice as strong as a single pole of equal cross section, in the direction of the transmission line, while deflecting only half as much. The tests carried out by Mr. Wade make clear the point that many of the poles used in this country are badly proportioned, some being excessively heavy and others dangerously light.

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**Stonework and Sulphur Acids.** IN our issue of the 20th ult. we commented upon the lecture recently delivered at the Royal Institution by Professor Church upon the preservation of stonework and mural paintings exposed in an atmosphere containing sulphur acids. We have now received a printed copy of the lecture. It should receive the careful attention of all architects concerned with the preservation of important buildings or valuable wall paintings. Professor Church is a distinguished chemist, has studied the subject of stone preservation for over half a century, and has had placed under his supervision important preservation work at Westminster Abbey and the Houses of Parliament. He confesses that he is a "thiophobist," *i.e.*, a hater of sulphur, and he regards sulphuric acid as the constituent of town air which is the most destructive to stone. His thiophobia leads him to protest against the increased amount of sulphur which Parliament has recently permitted to be present in London gas as a result of the recommendations of Lord Rayleigh and other eminent men of science. These gentlemen were quite well aware that the presence of sulphur compounds in the atmosphere is objectionable. When an inexpensive and innocuous process for removing the whole of the sulphur from coal-gas is invented it will probably be speedily adopted. Professor Church recognises that the most impure gas sent out by any London gas company when used as a fuel in place of raw coal sends into the air much less sulphur than would be emitted by the coal it has displaced. He should rejoice, therefore, that the use of gas as a substitute for coal is extending with great rapidity.

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**A New Suggestion for Railway Signals.** WE noticed briefly last week, under the head of "Magazines and Reviews," an article in the *Century* on railway disasters in America and the need for some alteration in the system of night signalling, but had not space to do more than mention it. But the article contains an important suggestion which is worth further attention. Mr. Stratton asks why it is necessary that day and night signals should be made on two different systems; the position of the semaphore arms by day, the colour of lights by night. He points out, quite rightly, that every one with fairly good eyesight can see whether a semaphore arm is straight out or lowered, but that many men with fairly good eyesight are more or less colour-blind to red without even knowing it (in America the difficulty seems to be complicated by the retention of the green signal for "caution," which we have abandoned). His suggestion is—employ a luminous semaphore arm at night, so that the driver will read the signals in just the same way by night as by day. It really seems a very practical idea, which there ought not to be much difficulty in carrying out.

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**Old Scotland-yard and Whitehall.** IN our number of May 18 we recorded that the Westminster City Council have agreed to a proposal of the Office of Works to open out Scotland-yard and to widen the western end of Whitehall-place concurrently with the rebuilding of Government property at Nos. 1 and 2, Whitehall-place, and No. 1, Whitehall, and to effect other improvements hereafter in that quarter. No. 1, Whitehall, was built by Robert Adam in 1771. There is a view of the front in the "Crowle" Pennant, British Museum; the plate, engraved by R. Blyth, is lettered, "Elevation of a house at Whitehall restored as a board-room for the Paymaster-General," etc. Above the attic (fourth) story is a trophy of arms, supported by a lion and unicorn. The house is now occupied by the Woods and Forests and the Board of Trade; forty years ago it was the Registry of Designs. On the north side is the archway, leading into Scotland-yard, which T. Chawner rebuilt in 1824, carrying the archway up another floor; in the Crace collection are his coloured drawings of the old and new archways. Chawner's signed plan of August, 1821, lettered "the newly-erected houses in Whitehall-place," shows plots of houses erected on the Crown property, including Nos. 1 and 2, Whitehall-place, now the Office of the Woods and Forests, and the adjoining house—at one time the Dutch Ambassador's—which were built by William, brother of Robert and James Adam. In the middle of Great, or Old, Scotland-yard, stands the building which formed the headquarters of the Metropolitan Police from the time of their establishment in 1829 until they removed in 1890 to New Scotland-yard in Cannon-row. The archway represents the former northernmost gate of the precincts of Whitehall Palace.

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**The Homes of the "Clapham Sect."** IN his "Life of Lord Macaulay," Sir George Trevelyan wrote: "At Clapham, as elsewhere, the old order is changing." Written more than thirty years ago, these words apply with far greater force to the present day. One by one the old red-brick mansions, once entirely surrounding Clapham Common, have given place to smaller houses, terraces, and blocks of flats, and their finely timbered grounds have become "eligible building sites" for numerous streets and roads. One looks in vain for the early home of Macaulay, the old Manor House where Priscilla Wakefield wrote her "Perambulations," and the house where Cavendish the chemist "buried his science and his wealth in solitude and insignificance." Lord Teignmouth's house, the birthplace of the Bible Society, was long since turned into a monastery, and the former homes of other "Claphamites" have quite disappeared. Among those which still remain is Battersea-rise House, near the residence of Wilberforce, once occupied by Henry Thornton, and before that by Mr. Lubbock, the banker, an ancestor of Lord Avebury. This house, which will shortly be offered for sale by auction, contains the oval saloon planned by William Pitt, and remaining, as stated in Stephen's "Essays," "a solitary monument of the architectural skill of that imperial mind." In this apartment was organised and conducted the movement for "the reformation of manners and the suppression of slavery," in which Thornton and Wilberforce took so prominent a part. The adjacent house, known as Glenelg, for many years the home of the Grant family, will be offered for sale at the same time, as well as Maisonette, where lived Sir James Mackintosh, the Whig statesman, historian, and philosopher. Clapham no longer deserves to be called "that sanctified ville," and we fear the few remaining homes of its "sect" will soon be obliterated by that irresistible latter-day magician, the London builder.

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## ARCHITECTURE AT THE ROYAL ACADEMY.—III.

CHURCH architecture, with the exception of the exhibits of Mr. Bodley and Mr. Jackson, already mentioned, is not very prominent at the Academy, though there is more of it than appears at first glance. Mr. Horsley exhibits a water-colour drawing of "New Reredos, St. Peter's, Hammersmith" (1476); a reredos for a classic church; wood panelling and pilasters below, and two paintings on each side of the east window filling up the space above, with a fifth painted subject immediately above the communion-table. The segmental-headed east window is shown filled with stained glass, the upper portion with the figure of the Saviour in the midst of a kind of circular glory. The line of the segmental arch of the window head is echoed in the panelling below. The effect of the colour in the paintings and stained glass is hardly conveyed in the drawing, which in this sense leaves a good deal to the imagination. Mr. J. T. Lee's "Interior of St. Margaret's, Eastney" (1482), shows chiefly the chancel; the peculiar feature is that there is a high narrow arch on each side of the chancel arch, giving access to what seems to be a narrow vaulted aisle outside of the chancel arcade, apparently for access to the stalls without entering by the centre of the chancel; a plan would have explained it better, but there is none. Mr. Dare Bryan's "Proposed Baptist Chapel" (1485) is a small classical building with coupled and strongly rusticated Roman Doric columns at each side of the front, carrying the usual block of entablature which forms the impost for a deep set arch of plain masonry finishing in a low-pitched gable; beneath this arch are the windows and entrance doors. It is a solid piece of masonry design, but without much charm.

Mr. Temple Moore's "All Saints' Church and Vicarage, Tooting Graveney" (1491), is a good water-colour drawing of the exterior of a red-roofed church with buttresses and windows of decorated type, and a low building tacked on to the east end which may be a morning chapel; it does not look as if it were the chancel, but there is no plan of either church or vicarage. The succession of mullioned windows in the house seems a little monotonous.

Mr. Dixon-Spain's "Proposed Church, Cumberland" (1526), to which a plan is attached, is a small church with an aisleless nave, with a solid masonic character suitable to a stone country; the organ-chamber looks a picturesque addition in the view, but the

organ must be very much buried. The small tower is unusual in character; gabled each way at the top, with an open segmental arch on each face. This small church is original and picturesque in treatment. There is a great deal of character too in Mr. Tapper's "Lythe Church, Yorkshire (1530: no plan), the exterior and interior of which are shown in two small slightly executed water-colour drawings: a squat and square tower with a very short stone spire rising out of it. The interior shows a simple arcade with a cornice immediately over it from which rises a barrel ceiling apparently plastered, with transverse flat ribs over the piers; but the drawing is too slight to show the treatment very definitely. But it is interesting, because not commonplace; a praise which we fear can hardly be bestowed on Messrs. Oliver, Leeson & Wood's "Proposed Tower, St. Barnabas, Dulwich" (1533), or Messrs. Rodway & Dening's "Proposed Church of St. Alban's, Durdham Park, Bristol" (1535); the latter is a "busy" kind of design cut up into a good many features, but we cannot say it interests us; it has the merit of having a plan attached. Mr. Temple Moore's "New Choir and Transepts, All Saints' Parish Church, Eccleshall" (1537: no plan), shown in a rather rough line drawing, is simplicity itself in conception; three long lancet windows on the upper part of the east end, under the gable, three shorter ones beneath; five lancets in the gable end of the transept; the only thing *hors ligne* is that the gates to what may be a crypt under chancel and transept have large round-headed archways; a little demonstration against archæological precedent which just gives a touch of originality. Mr. Durst's "St. Paul's Church, Bushey" (1540), is a little aisleless church to seat 210, with the unusual adjunct of a "kitchen and class-room" in a projecting wing on the north side—it is evidently designed for some special circumstances. There is a very little exterior perspective and a larger interior one, showing a chancel with a canted roof, and a rood-loft on mullions and with solid panelled below; all very plain but in good taste.

Mr. Caröe's "St. Andrew and St. Patrick's Church, Elveden" (1543: no plan), is shown in a large and fine line drawing; a large plain square tower with some inlaid flint work at the base, and a nave with traceried windows inserted beneath deeply recessed segmental arches; apparently it must be a passage-aisle church, as the outer buttresses finish with the offsets against the wall, but gabled buttress heads rise from the roof a little within the parapet line; both a section and a plan were wanted to show the design properly.

Messrs. Collinson & Cock's "St. Mary's, Holly Place, Hampstead" (1545), is a good water-colour of a pleasing bit of interior of a classic church; wooden columns, pilasters, and panelling up to the springing of the roof, which shows a massive transverse stone arch above the columns; the rest looks like a plaster vault, with transverse arched soffits above the pilasters. For a church interior of this type—not very ecclesiastical according to prevalent ideas—it is very good.

Mr. Jewitt's "Design submitted in Liverpool Cathedral Primary Competition" (1548) we fancy must be a new drawing—we do not remember it in the competition. It is a very elaborately coloured and ambitious piece of what we should call Classical Gothic, *i.e.*, the general treatment is Gothic but the details are Classic. The nave arcade springs from piers with Ionic shafts carrying a piece of entablature with a pulvinated red marble frieze; from the face of the piers a fluted pilaster runs up to the cornice below the large clear-story windows, playing the part of the vaulting shaft in Gothic architecture; the triforium is replaced by a pictured frieze. Are the main arches intended to be slightly elliptical, or is it only defective drawing of the curves? If elliptical, they would not have looked well. The coloured treatment of the barrel-vault is forcible and effective, and the whole thing very clever, though we cannot desire that it should have been carried out.

Why the drawing by Mr. Pocock, called simply "A Church" (1552: no plan) should have been hung, and hung so advantageously, is a mystery. It is a large drawing of a commonplace-looking Gothic church tinted a disagreeable yellowish tone and scrawled over with carelessly drawn joint markings, and a spongy indication of a tree behind; the tower is not even drawn straight; it is a bad piece of work, and why it should be allowed to occupy so much space on this limited wall we cannot understand.

Messrs. Greenaway & Newberry's "St. Hilda, Crofton Park" (1558: no plan), is a very interesting and original church design shown in a small and unpretending but artistic drawing. From the exterior treatment of the windows it is evident that the authors are among those who disapprove of the large east window and prefer to throw a side light on the sanctuary; the east wall shows only one small traceried window high up in the roof, while there is a large window under the eaves at the side. The short tower, with its massive octagonal angle turrets, contrasted by the thin lead spire rising from its centre, looks admirable. We may mention at the same time the "Proposed New Church and Parish Hall, Herne Hill" (1643: no plan), by the same architects; the church is less original than the other one, but it is a good design, and the Parish Hall looks as if it would work out into a very picturesque building.

Mr. Macdonald Gill's "Study for a Chancel" (1563) is essentially a study of colour decoration, shown in a very good and highly finished perspective drawing of an interior. The author is not afraid of strong colour, and has applied it effectively and harmoniously in the decoration of the stalls and of the ceiling of the chancel, with a floor in black and white marble squares as a foundation. An organ is introduced, with the supporting wood standards decorated in a simple but effective manner; but we wish the tops of the organ pipes had not been left sticking up with visible irregularity; it is quite a mistake to do this; the system of concealing their tops by a decorative design is far more artistic. The author does not seem quite to have known what to do with his walls; the sprigs of floral decoration on them are weak and out of keeping with the heavy coloured treatment of the rest; but as a whole it is a clever piece of work.

What is the meaning of Mr. Archibald Dunn's "Design for the Cathedral Church, Westminster" (1567)—why it was made, and still more why it was hung, is what we cannot understand, unless merely because it is a good water-colour drawing. It represents a Gothic interior with a gewgaw coloured roof in what appears to be a wooden imitation of fan vaulting springing from the walls, but not meeting in the centre; betwen these "fans" is a tie-beam roof. It is as absurd as it is pretentious.

Messrs. Douglas & Minshull's small drawing of "Sanctuary Fittings and Screens, St. Mary's R.C. Church, Latchford" (1587), shows some good woodwork of a quiet and unpretentious type, illustrated with a good water-colour drawing. Messrs. Paul & James's "Memorial Chapel, Colston School, Bristol" (1588), is a classic chapel with an Ionic order of coupled columns on the front, carrying an entablature and pediment, and placed on a rusticated podium; this portion of the design is well treated, but the flank design is commonplace. A plan is given. Mr. Reavell's exterior perspective of "U.F. Church, Coldstream" (1590: no plan), shows a well-treated tower, perfectly plain up to the window-stage at the top, which gives character to an otherwise not very noticeable building.

Mr. Eastwood's "Bishops Throne, St. Anne's Cathedral, Leeds" (1591), stands in front of the arch between two piers, the canopy and spire cutting across the lines of the arch and its superstructure in an effective manner; the spandrels of the arch are occupied by ecclesiastical paintings, and the space on either side of the throne below filled up with mullions and tracery: the whole arrangement is effective. Mr. R. A. Briggs's "Proposed Church of St. Saviour, Sunbury Common, Middlesex" (1596), is a small aisleless church with a chapel added on at the back of the east wall of the chancel; the interior of the nave is wainscotted to half the height of the walls, with a ceiling with flat ribs springing from cherub-head corbels, and a cross vaulting between, obviously in plaster. It is unobjectionable, but looks rather more like a committee-room than a church. Mr. Horseman's "Oak Screen and Pulpit, St. James's Church, Barton Hartshome" (1621), is a nice little drawing, but why classic woodwork with balusters should be placed in what is apparently a Gothic church (see the traceried window at the back) we do not understand. Mr. Ernest Short's "Design for English Church, Mauritius" (1631), is shown only in a small and carefully drawn and coloured section; a note states that the construction is mostly teak. The spaces of the roof timbering are filled in with flamboyant tracery coloured blue. A plan would have made it more intelligible; a section without a plan is almost worse than a perspective view without a plan. There are indications that the design may work out into something clever and original.

The fine design for the Chapel of the Resurrection at Mirfield, by the late Mr. Skipworth, we have already published (see our issue of April 27). Mr. R. W. Paul illustrates in two of his clean and finely executed pen drawings his treatment of the quaint little church of Sarnesfield, Herefordshire, as restored and rebuilt (1660: no plan), which will be illustrated in our next issue.

## SCULPTURE AT THE PARIS SALON.

By H. HEATHCOTE STATHAM.

WANT of space compelled me last week to postpone my remarks on the sculpture at the Salon. At the New Salon sculpture plays but an unimportant part, the central work in the middle of the circular entrance-hall being a mutilated figure by M. Rodin under the title "Homme qui Marche." At the New Gallery we have a statue by M. Rodin without a hand; at the New Salon is one without a head. This habit of exhibiting mutilated figures is simply a pose of M. Rodin's restless vanity; an assumption that whatever comes from him is to be accepted as valuable, whether the figure is completed or not; an attitude in which he is bolstered up by the art-critics, who have already welcomed this headless figure with the usual silly effusions of delight. The Royal Academy and the Old Salon, at all events, are sufficiently ruled by common sense to refuse the exhibition of mutilated figures.

It is in the great central hall of the Old Salon that the French sculpture of the day finds its real representation. Among this immense and heterogeneous crowd of figures and groups there is no doubt a certain amount that is commonplace and some that is sensational; there is rather an increasing tendency towards realistic subjects from everyday life, which are not suited for so abstract an art as sculpture; but after all allowances made, how much there is that is suggestive in idea and fine in execution. A noteworthy point in a large collection of French sculpture is that one finds so many works that have an intellectual suggestion; that are something more than mere modelling in composition. Take, for instance, M. Hugues's "L'Homme et la Misère," a kind of Laocoon idea; "La Misère" a serpent that winds him and his son in its folds, and stares him in the face with a thin malicious human head. Of the same type is M. Bardery's "Première Désillusion," a nude figure of a young man seated, with his feet crossed and his head bowed down with an expression of grief and anxiety very finely rendered. Two of the most important of these subjective works have been purchased by the State, and are illustrated in two of the plates in this issue. The meaning of M. Roussel's "Le Pèlerin de la Vie," the seated figure with faces in the background, is somewhat vague; probably it is meant to suggest the kind of life which has laid hold upon nothing, which goes on its path alone and loses all the joys of life. The other work illustrated, M. Seysses' "Le Soir de la Vie," is explained in four lines inscribed at the base:—

"Mon ame vide et sombre est comme une cimitière,
Où quelques revenants, frappés d'une lumière,
Se relèvent encore avec les traits chéris
Des jeunes souvenirs que le Temps n'as pas pris."

Read in the light of these lines, it is a fine and pathetic work.

The axial line of the sculpture court, as usual, is occupied by some of the large monumental erections intended for the decoration of public places or buildings. The best of these is perhaps M. Dubois' grandiose monument to Bossuet, to be erected in the Cathedral of Meaux (the seat of Bossuet's bishopric). The figure of the great preacher is mounted on a lofty stele, one hand raised as if in the act of declamation; an eagle with spread wings beneath him. He has four listeners: on one side of the base of the stele a young man and young woman in the court dress of the period represent the society to

which he preached (probably rather in vain); on the other side the figures of a nun and a Huguenot appear to represent the opposed religions which Bossuet wished to reconcile. It is a fine and striking monument, though perhaps not of the highest order. M. Blondat's monument of the Centenary of the Ecoles d'Arts-et-Métiers, erected at Chalons-sur-Marne, is exhibited in a full-size plaster model, and is a spirited example of the symbolical style of monument; two youths at the top with respectively a chart and a hammer; the prow of a ship on one side at the base, the front of a motor-car on the other side, each accompanied by a suitable and expressive figure; part of the detail shows the novelty of the cogwheel worked into decorative form. Another of the large central exhibits is M. Gasq's "La Fontaine de Subé" at Reims; this is also a plaster model the size of the original work executed in stone, and representing "Le Commerce et l'Industrie de la Champagne"; the centre termination is a broken-off column round which figures in high relief circulate; other figures at the base; but the monument seems rather to want point and meaning, though it is very decorative in effect. M. Gaudissart's monument to the victims of the *Farfadet* and the *Lutin* (the two lost submarines) is obvious in its meaning, with which every one will sympathise; but the half of a tubular submarine, real size, is a realistic feature more startling than beautiful in a sculptured monument. Very different is M. Maillard's monument to Fragonard, intended for the town of Grasse; this is a portrait statue of the painter, with a figure of a country girl at his shoulder as if running up to him (a figure copied, I think, from one of his own pictures); the monument is just suitable to the light-handed genius of Fragonard, and the figures stand on a very well-designed architectural pedestal. Towards the south end of the court is a great bronze fountain by M. Vallgren, a Finland artist settled in Paris, intended for the town of Helsingfors; quite the correct thing for a seaport fountain—four seals squatted on the rim of the lower basin, and above the upper basin a robust nymph carried on a pedestal of twisted fishes; there is a sort of *bravura* about the thing, but it is not first-rate. On the centre line is also M. Hugues's really fine work "Les Danaïdes"; a decorative fountain in marble, intended for Marseilles. The principal figures are grouped on the upper portion of the composition—nude figures of fine design, but with the wearied expression proper to their supposed situation; one of them endeavours with her hand to stop the outflow from the fateful cistern. The plaster model of this fountain was exhibited three or four years ago, and was illustrated in the *Builder* of January 2, 1904.

Beyond the placing of these large monumental works of the centre axis, there is no sort of arrangement or sequence of numbers followed in the sculpture court; and one may as well notice some of the other important works in alphabetical order; there is no means of defining what part of the court to find them in. M. Birot's stone statue "La Veuve," a heavily cloaked figure carrying a bouquet of flowers for the tomb, might not have claimed mention but for the fact that it is a State commission—why or for what situation is not stated. M. Bouchard's "La Carrière" is also a State purchase, for obvious reasons: the present Government always poses as the friend of the working classes, and this realistic group of a dead man carried up from the mine by two of his comrades is a manifest appeal *ad misericordiam*; in its way it is forcible and well done. Then we come to perhaps the most beautiful work of the year, a work of pure imagination—M. Alfred Boucher's "La Pensée"; a marble figure seated, leaning on one elbow, drapery very finely treated, and a lovely musing face exactly answering to the title. One is glad to see that the State has, with a wise discernment, bought this also; but most of the people in England who rave over the headless and armless eccentricities of M. Rodin probably never heard of M. Boucher; do not know his works or his name.* M. Carli's "Roméo et Juliette," of which an illustration is given (I would much rather have had an illustration of "La Pensée," but there was not one to be had), attracts a great deal of popular attention, but it is really a portrait of the singer, M. Salignac, in the part of Romeo, and he is supposed to be singing; without that explanation it has rather an absurd effect. M. Vincent's "Carmen" is grouped with it on the plate, as being another operatic statue, and in its way a very good one; in front view it looks rather as if it had been partly suggested by Mr. Sargent's well-known picture "Carmencita."

M. Charpentier's "Matinado," also purchased by the State, a nude figure stretching herself as if just awake, is something like a female version of Leighton's "Sluggard." M. Damé exhibits a small model of what would be an immense monument in honour of "L'Entente Cordiale," which seems like a bid for a commission, and which would be a fine thing if carried out. There is a concave quadrant of wall with bas-reliefs, and a central pedestal and niche on which are grouped figures representing France and England, Arts et Mètiers below, and a figure of "Peace" crowning the whole. The architectural portion is by M. Pigeard.

M. Holweck's monument to Bernardin St. Pierre, intended for the Museum of Natural History, shows his portrait statue seated on a rock pedestal in front of which, in alto-relief, are the figures of Paul and Virginia. M. Hippolyte Lefebvre, one of the apostles of realistic sculpture, exhibits the marble replica of his "L'Hiver" of last year—a dear old lady coming down her door-steps in the snow, and a new work entitled "Le Chant," a man in evening dress, life-size, singing; it sounds absurd for sculpture, yet he has managed, by the rapt expression of the face, to make it interesting. M. Leyrik's "Rêveuses" is another realistic subject—two girls in everyday dress, the one with her head leaned affectionately on the other's shoulder; a very charming work of its kind. M. Marqueste's portrait bust of Saint-Saens, for the presentation to the City of Dieppe, is a fine and forcible likeness. We come into the region of idealism again with M. Mathet's very fine and pathetic "Consolatrix"—two nude figures, one wringing her hands in the air, the other tenderly embracing her with a kiss of sympathy; a beautiful work both in composition and feeling. M. Mercié has contented himself with small things this year; his plaster statue, "Le départ du Village," is a pretty *genre* figure of a peasant girl starting for market; the other, entitled "Waterloo," is to be found in front of the statuettes and *objets d'art* collected on the platform at the north end of the court. I was curious to see how a French sculptor had treated Waterloo. It is a fine bronze statuette of Napoléon, in great-coat and cocket hat and with his hands behind his back, and at his feet the French eagle, on its back and broken-winged. It is a curious thing to find in a French exhibition. Is it sympathy with Napoléon, or is it that M. Mercié is a staunch Republican, and repudiates the Napoléonic idea?

M. Gustave Michel also exhibits a statuette, "La Paix"; a polychrome with marble for the flesh parts and gilding and (I think) some enamel for the robes, which are sumptuous; the figure has in fact a kind of Rubens-like amplitude—"Peace" personified in a regal and magnificent manner. Then we come to a very large and important work—M. Moncel's bas-relief group "Le Rêve du Poète"; almost a scene rather than a bas-relief, for it is worked out in the hollow of a vast mass of marble. This is another illustration of Alfred de Musset's beautiful poem "Nuit de Mai," and shows on the right the poet, in his habit as he lived, contemplating the figures of his dream. This mingling of real figures with ideal ones is always a difficulty, and sometimes results in an absurdity in sculpture; here the low relief of the figures helps to get over it. This is a joint commission from the State and the municipality of Paris; where it is to be placed is not stated. It is to be hoped it is not to be placed in a street, as they have already placed another group of De Musset and his Muse on the footpath of the Rue de Rivoli, to be jostled by the common crowd of the street.

Among other works to be noted are M. Perrin's figure of Time as "L'Eternel Rémouleur," scraping the surface of the globe with the blade of his scythe; M. Peyrol's fine "Lion" in marble; M. Eugène Piron's fanciful "Jeune Faunesse," dancing with pipes at her lips (purchased by the State); M. Roux's "Les Convalescents," a monument to a benefactor of hospitals, whose portrait appears on a stele, accompanied by life-size realistic figures of convalescents—a work un-sculptural in style, but not without interest; and M. Sicard's beautiful figure of "Eve," weeping after the Fall, of which an illustration is given on the plate.

There are many other works which are of real merit; and among the crowd of statuettes and *objets d'art* on the platform at the north end of the court many charming little things are to be found, mingled no doubt with some that are in poor or debased taste. But when all deductions are made, the sculpture court at the Salon presents a spectacle of artistic vigour, invention, and originality such as is to be found in no other collection of modern sculpture in the world.

* I might have said "The two Bouchers," for there are two, Jean Boucher and Alfred Boucher, of whom it is difficult to say which is the finer artist. They are not relations, though of the same name. M. Jean Boucher's noble work, "Antique et Moderne," in a former Salon, was illustrated in the *Builder* at the time. He does not exhibit this year.

## NORTH-COUNTRY ITEMS IN ELIZABETHAN TIMES.

THE publication of a new volume by the Surtees Society brings before us about 300 wills deposited in the Durham Registry in the days of Queen Elizabeth. Nearly half a century ago the Rev. Canon Greenwell and the Rev. James Raine edited two volumes of wills selected from the same source; and this third one has been in contemplation ever since, and has now been accomplished by Mr. J. Crawford Hodgson. The two antiquaries first in the field chose the wills of persons of consequence in the northern counties; it remained, therefore, for Mr. Hodgson to edit the most interesting of those made by lesser folk, such as merchants, mariners, farmers, tradesfolk, and professional people. By the aid of his labours we can see the interiors of many Elizabethan houses with their contents; the old "shippes" that sailed up and down the Tyne when Drake and Raleigh were on the high seas, the *Mayflour* (as they had it), the *Speedwell*, the *Chanswell*, the *Mary Grace*, the *Bonaventure*, and the like; and hear the farming folk call their cattle from browsing in their pleasant pastures by their names, Primrose, Goldlocks, and so forth. So many articles of wearing apparel are mentioned in these wills that we may almost see the Queen's lieges in their habits as they lived.

The wills, for the most part, begin by stating where the testator wishes to be buried; and we see how completely absent was any consideration of the unsanitary consequences of burial within their respective parish churches. Many especially indicate the "quire" as the desired spot. An an exception, a senior curate of St. Nicholas's Church, Newcastle-on-Tyne, now the cathedral, specified that he wished to be buried under a thorn-tree in the churchyard. George Fuister, too, a barber-surgeon, directed his executors to bury him before the wedding church door in All Saints' Church, in the same city, which spot was presumably outside of the fabric. Some compunction is shown in the matter of tithes, several persons leaving small sums for "forgotten" tithes; and various sums were frequently left for the poor man's box.

Curiously, a great number of the testators make special mention of a silver whistle and chain as part of their possessions they were anxious to confer upon particular individuals. Pewter whistles were not in such abundance, though they are occasionally specified. There is mention in one will of a whole "garnish" of pewter which consisted of forty-eight pieces; another testator left forty-nine pewter pieces; another left twelve "banquetting dishes." Many silver items are bequeathed, such as goblets, with or without covers, salts, pots, and spoons. Sometimes these are mentioned as tokens of remembrance, or of gentle and friendly remembrance. There is frequent mention of silver crooks. Many coins, too, are set apart as legacies. These are chiefly gold rose nobles, gold angels, or half-angels, Edward shillings, a French crown, a Portingale piece in gold, "ryalls," and marks.

Articles of wearing apparel are often mentioned as tokens. William Bewick, merchant, desired that Richard Benson should

have his velvet hat and six yards of worsted for a token, and Sir George Connynham should have his third gold ring (the first and second being otherwise apportioned). Thomas Harrison left his new canvas doublet and black breeches to Thomas Humble, trusting he would take care of the testator's children. Weapons, too, are bequeathed that tell of the age; bows and arrows, quivers, a brooche sword, a halbert, etc., besides pistols, rapiers, and daggers. The faith in friends is remarkable. Children are left to their care with apparent certainty of acceptance. A testator left his daughter Eleanor to his well-beloved friend Jean Barker, and if this friend was not wiling to accept her, he gave her freely to her god-mother, Eleanor Nicholson. Cuthbert Blount, merchant, left the tuition and goods of his son Edward to his Uncle Morland, and of his daughter Anne to his Aunt Agnes; another son's tuition and goods to a brother, who was to have a young bay gelding for a token, and so on. Thomas Tobie, barber-surgeon, gave his son, George Tobie, to his friend Rauffe Tate, with the "Book of Martyrs," a herbal, a Bible, John Vigo's work on "Chirurgery," and a book by Ballin. Peter Bewick desires his master, Mr. Mytford, to bring up his daughter Barbara. Sir Robert Elliker, knight, besought the Earl of Northumberland to receive his son into his service and government.

Glancing at interiors, we see in various wills mention of the hall, a chamber over the hall, the mayden chamber, the parlour, kitchen, servants' chamber, the new chamber, and the little chamber. The Newcastle house of Sir William Hatton had a great chamber, a bed chamber with an inner chamber, a study, and hall, besides kitchen, etc. In the way of furniture there is frequent reference to stools and beds and tables, but very rarely to a chair. George Brown, cooper, sets down who is to have his covering of tapestry. Eleanor Cook mentions who was to have her fine linen sheets, her best gown and kirtle, and her worsted gown and kirtle; and which of her friends were to have ryalls and old angels, and that her son-in-law was to have a goblet of silver. It was, we may be sure, with even more than gentle and friendly remembrance that Henry Riddell, merchant, left 50*l.* to Elizabeth Liddle, whom he meant to have made his wife; and that another testator left his dead wife's wedding gown to one especially named. When we call to mind that these testators were the contemporaries of Shakespeare, and Ben Jonson, Bacon, and other luminaries, as well as of Elizabeth and her courtiers, and Mary, Queen of Scots, and her friends and enemies, their possessions seem to have a special interest for us. We close the book as we would shut down the lid of a chest of curios.

## FIRE TEST OF REINFORCED BRICK FLOOR.

BRICKWORK requires no recommendation as a fire-resisting material, for its qualifications in this respect are beyond dispute. But without the aid of steel in some form bricks cannot be conveniently applied to floor construction of the kind required in ordinary buildings.

A report issued last week by the British Fire Prevention Committee gives the results of fire and load tests upon a floor built of stock bricks and concrete, both reinforced by longitudinal bars of steel. The bricks were laid on edge in one course, the rows being 1 in. apart. The spaces were filled with Portland cement mortar in the proportions of 1 : 3, and in three out of every four spaces steel bars $\frac{5}{8}$ in. square were laid at the distance of $1\frac{1}{2}$ in. above the under surface of the floor. The bars were bent upwards near each support, and their ends formed into hooks of about 6 in. diameter projecting above the upper surface of the bricks. The floor was completed by a layer of concrete $5\frac{3}{8}$ in. thick, composed of one part Portland cement, one part of sharp sand, one part granite chippings $\frac{1}{4}$-in. gauge, and one part granite chippings 1-in. gauge. Three hooked bars were applied as transverse reinforcement in the concrete immediately above the bricks.

The floor thus built had the total thickness of $9\frac{3}{8}$ in., the centring was struck after the lapse of twenty-six days, and at the time of testing the work had been hardening for 112 days. When the distributed load of 280 lb. per square foot had been imposed the floor was subjected to heat with the results stated below.

In ten minutes, at the temperature of 850-900 deg. F., flakes of mortar commenced to fall from the joints; in fifteen minutes, at the temperature of 875-900 deg. F., the floor began to deflect and continued to do so until the maximum deflection of 3 in. was recorded at the temperature of 1,900-2,000 deg. F.; in 20 minutes, at the temperature of 900-1,000 deg. F., the corners of the floor warped upwards, leaving spaces which ultimately increased to the maximum of $3\frac{1}{8}$ in. at the end of the tests and through which the interior of the building could be seen; in thirty-six minutes, at the temperature of 975-1,050 deg. F., the four sides of the floor commenced to rise; in fifty minutes, at the temperature of 1,075-1,175 deg. F., the warping of the floor began to loosen the upper courses of the brickwork of the testing-chamber; and after the expiration of sixty minutes, at the temperature of 1,420-1,520 deg. F., vertical cracks appeared on the under side of the floor.

On the removal of the load, four transverse cracks were found in the upper surface, and two of these extended to the lower surface of the floor, the permanent deflection of which was $1\frac{1}{2}$ in. Neither fire nor water passed through the construction, which was awarded the classification of "Full Protection."

Our readers will find it interesting to compare the results with those contained in previous reports of the Fire Prevention Committee on concrete-steel and other types of fire-resisting floor construction.

## WATER CHARGES BILL.

ON Thursday (May 16) Mr. Blennerhassett, K.C., opened the case for the Westminster City Council.

Mr. A. J. Pilditch, L.C.C., Chairman of the Law and Parliamentary Committee of the Westminster City Council, giving evidence, said the proposals would mean an increased charge to Westminster of 52,504*l.*, a larger sum that any other district would be called upon to pay.

Mr. Woodhouse, the Westminster City Comptroller, said that under the Bill the cost per head in Westminster would be 1*l.* 3s. $2\frac{3}{4}$d., and in the outside area it would be 3s. 7d. per head, for the County of London 6s. 4d., and for the total area the price was 5s. 6d. He argued in favour of an additional charge of 1 per cent. on properties outside London, and contended that if a 30 per cent. rebate was to be given to the City of London, it should also be given to Westminster.

Mr. Ram, K.C., addressed the Committee on behalf of the Bishop of London's Estate, which formerly belonged to the See of London, but now belongs to the Ecclesiastical Commissioners. This estate has for many years been entitled to a reduction of 10 per cent. on the charges made for water for domestic purposes. He argued that under the Act of 1902 the Board had to take over all the Water Companies and all their liabilities, and included in them was this particular liability, which represent 4,700*l.* a year, which sum had to be capitalised against the company in fixing the price the Board had to pay for the undertaking. If the arbitrator took thirty years' purchase in giving his award the Board acquired the undertaking 141,000*l.* cheaper than otherwise would have been the case. If twenty-seven years' purchase were the period taken, then the Board saved 126,000*l.* They now proposed to keep this sum in their pocket and to charge the occupiers of the estate 4,700*l.* a year additional. This had the merit of simplicity, but it had the demerit of dishonesty.

Mr. Blennerhassett, K.C., on behalf of the Paddington Borough Council, also addressed the Committee.

Mr. Morgon, Chief Engineer to the L.B. and S.C. Railway Company, gave particulars of that company's consumption in the Kent, Lambeth, and Southwark areas of the Board, and said that under the Bill their charges would be doubled. Moreover, under the Bill the Board said the maximum supply they should give was fixed at 500,000 gallons a day, and the Railway Company were at present taking 1,000,000 gallons a day, so if the Bill were passed they would only be able to get half their requirements.

Mr. Ryde, rating surveyor, said the railway companies in London were now supplied at an average rate of 6·49 pence per 1,000. If the Bill were passed the railway companies would have to pay 82,638*l.* more than they already pay, viz., 94,414*l.*

This closed the opposition, and the room was cleared. When the parties were called in,

The Chairman said as to how the outsiders were to be dealt with was a question for the general law. It was not for them to decide that point, and they would not trouble Mr. Fitzgerald to answer that part of the case.

Mr. Fitzgerald, K.C., then replied for the promoters. He said the promoters were prepared to accede to the suggestion of the traders of London that a scale should be inserted in the Bill, and the scale they asked the Committee to insert was the scale which had already been put before them. That scale began with a minimum rate of 25s., which was equal to 1s. per 1,000 gallons if the full 25,000 gallons were taken. It then decreased to 11d., 10d., $9\frac{1}{2}$d., 9d., $8\frac{1}{2}$d., 8d., to a minimum of 7d. for a quarterly consumption of 5 million gallons and over. In addition, the 25 per cent. additional charge for high-pressure service would be discontinued. Dealing with the builders, he said theirs was a special case. As regards their yards they got their supply in the same way as the ordinary trader. The special case was where a builder was getting a temporary supply for building a house. It was evident that some higher charge should be made for a temporary supply than for a supply for a manufacture which went on year after year. The companies met this difficulty by charging a percentage on the cost of the house to be built. The only alteration the Board had made was that instead of charging from 5s. to 10s. per cent., they took the average and charged 7s. per cent. all round. If this were not continued the only way to deal with it was to give a meter supply in all jobs over 1,400*l.* at a scale higher than the present scale, and in cases under that amount make a charge of 7s. per cent.

The room was then cleared, and, on the parties being recalled,

The Chairman said the Committee had come to the decision that the preamble was proved, and that the scale so far as the domestic tariff was concerned should be 5 per cent. on the ratable value, and as for a rebate, it must be uniform and applicable to the whole of the area. The Board should allow a rebate to all houses over 300*l.* ratable value, beginning, say, at 20 per cent., and rising to 30 per cent. As far as trade supply was concerned, the Committee thought a scale should be included in the Bill, and traders should not be bound to have a domestic supply first. The charge for public supply should be 6d. per 1,000 gallons, and there should be no increase in the subjects of public supply. The arrangement with the tenants of the Bishop of London's Paddington Estate should not be interfered with for the next twenty-five years.

The Committee then adjourned until June 6, when the clauses will be dealt with.

## THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A MEETING of the Irish district branch of the Association of Municipal and County Engineers was held at Belfast on Friday, and at Newcastle, County Down, on Saturday last week, when the works for the water supply of Portadown and Banbridge were inspected. The disappointing feature of the meeting was the small attendance of members from England and Scotland, taking into account the attractiveness of the programme and the admirable facilities provided by the London and North-Western Railway between England and Ireland.

The members assembled in the City Hall, where they were received and welcomed by the Lord Mayor (the Earl of Shaftesbury). The President briefly acknowledged the reception accorded by the Lord Mayor, and said these visits were of considerable advantage to municipal engineers and to the authorities they served.

The President (Mr. J. P. Barber, Islington) presided, and among those present were: Messrs. J. Cartwright (Bury), H. A. Cutler (Belfast), J. P. Norrington (London),

H. G. Nicholson Lailey (Trowbridge), A. E. Adams (Chippenham), P. C. Cowan (Chief Inspector for the Local Government Board of Ireland), J. W. Leebody (South Tyrone), Hart (Leeds), and E. Woods (Bangor).

*Sewage Pumping-stations.*

Mr. Henry A. Cutler, M.Inst.C.E., City Engineer, Belfast, read a paper on "Sewage Pumping-stations and Machinery." He said the installation of machinery for pumping sewage, although necessary only in low-lying districts from which sewage could not be discharged by gravitation, presented problems which most municipal engineers at some time during their career had to solve. Wherever possible, discharge was to be preferred and pumping to be avoided, for a study of the problem to be dealt with in a pumping scheme revealed conditions which were not difficult and costly to satisfy, but required constant vigilance to prevent flooding, even when the greatest care had been exercised in designing and installing the plant. In preparing a scheme for the drainage of a district, it was almost invariably necessary to take into consideration sewers which were already in existence, and frequently to recommend a scheme which, although the best possible in the circumstances, fell short of what might have been otherwise accomplished. In the drainage of a district where pumping had to be resorted to, it was a matter of considerable importance, where the whole area was not low-lying, to make the area from which sewage was to be pumped as small as possible by a proper selection of site for the outfall works, and to collect the sewage from the higher zones by intercepting sewers which would discharge by gravitation. In locating the position of a pumping-station one might, without giving much thought to the matter, select a site at the outfall works, which would usually be outside the probable building area, or, at any rate, far removed from the centre, but in many cases such a position would by no means be the most suitable or economical. Generally speaking, it might be taken that the site for a pumping-station in a practically flat district was a central position on the bank of a river or stream, towards which the sewers would converge. With such a site the sewers necessary would be comparatively small, short, shallow, and inexpensive, and the height to which the sewage would require to be reduced to a minimum, thus reducing the horse-power and first cost of machinery, as well as the annual expenditure. Against the selection of a central site, it might be urged that the sewage would have eventually to be pumped to the outfall works through an expensive main under pressure, which would counterbalance the saving in the cost of sewers, and that the power required to overcome the friction in the pipe would at least equal the saving effected by the reduction of the lift; but it must not be forgotten (1) that the maximum quantity of sewage to be treated to comply with the regulations of the Local Government Board was only six times the dry-weather flow, whereas the sewage flow in times of heavy rainfall was vastly in excess of that amount, and (2) that such excess could be pumped direct into the river or stream by special storm-water pumps. Of course, if a free outfall into the rivers or streams could be provided for storm water without pumping, either by storm overflows or separate surface water sewers, or if the district to be drained had a declivity all in one direction, a centrally-situated pumping-station might not be the most suitable. Another important matter for consideration in determining the site for a pumping-station was the facility for obtaining fuel, or electric, water, or other power for driving the machinery. When a site for a sewage pumping-station had been decided upon, the estimation of the maximum quantities of sewage and storm water to be dealt with, and the power to be used in driving the machinery, required a great deal of practical consideration, especially in view of the enormous difference between the minimum dry-weather flow and the flow during storms. On the supposition that the sewers were practically watertight, the volume of sewage, as distinct from rainfall, to be dealt with depended upon the water supply, and might generally be taken at 30 gallons per head per day. As an example of the variations in flow, for which provision had to be made in sewers, consider the case of a locality of working-class dwellings, with a density of population 250 per acre, and where the extent to be drained and the inclinations of the sewers were such that the flow takes thirty minutes to reach the pumping-station. Assuming a dry-weather flow of 30 gallons per head, the average sewage flow per acre would be 50 cubic ft. per hour, and with the rainfall conditions which obtained in Belfast, the rainfall intensity (for thirty minutes' flow) would be 0·66 in. per hour, or 2,420 cubic ft. per hour per acre. This gave a ratio of storm water to average sewage flow of about 50 to 1, or assuming the minimum sewage flow of about 100 to 1. Enormous as such a variation in flow appeared, it was not exceptional if subsoil water was entirely excluded; and, where storm overflows were impracticable, such a variation must be considered and provided for in designing the pumping plant. The plant for dealing with storm water would not be in frequent operation, and would very seldom be worked to its full capacity, and as no rule could be laid down for the variations of rainfall intensity, the number and duration of the periods during which the plant would be at work were unknown quantities. The total annual quantity of storm water that would require to be pumped could be approximated from the average annual rainfall, but what proportion of that quantity would fall with such intensity as to cause a flow, and thus require the storm-pumps to be operated was also an unknown quantity, for which, at best, an average measurement only could be obtained, even with carefully-kept records. To sum up the position with regard to storm water they could only approximate the maximum rate of flow and the average annual quantity to be dealt with. To prevent the possibility of a total breakdown, the pumping plant intended to deal with the sewage to be pumped to the outfall works, should be divided into at least two separate units, and in moderately large stations, where the sewage could not be impounded, a larger number of units would be desirable to economically deal with the possible fluctuations of flow, viz., from half the average to six times the average, or ranging from 1 to 12, because, as a rule, the nearer the full load the plant was worked the greater the economy. With the plant divided into two units, one unit might have a capacity of twice the average flow and work from quarter to full load, and the other unit a capacity of four times the average flow, and work from half to full load, for when the quantity to be pumped exceeded twice the flow, but was less than four times the flow, the smaller pump could be shut down and the larger operated. As the capacity of the plant had to be sufficient to deal with the maximum intensity of rainfall, which very seldom occurred, most of the units would usually be standing idle, so that there should be no difficulty in keeping the plant in order, and no necessity for duplicating the plant. For pumping storm water, where economy of working was not of first importance, the centrifugal pump was the most suitable, in all cases where a sufficient number of units could be installed so as to work within the economical range of discharge, or where the difficulties of varying discharge could be overcome by impounding. For the portion of the plant more constantly in use where efficiency was of primary importance, the question of size, gearing, and impounding must all be considered in coming to a satisfactory conclusion, but it was usually desirable to have a reciprocating pump for one of the units dealing with the sewage to be pumped to the outfall works, so as to get the advantage of its greater speed range, provided the driving machinery was capable of giving the same variation of speed.

*Portadown and Banbridge Water Supply.*

Mr. R. H. Dorman, M.Inst.C.E., County Surveyor of Armagh, read a paper on the Portadown and Banbridge Water Supply. He said that previous to the inception of the present works many schemes were suggested for supplying these towns with water. Eventually the Portadown Urban Council called in Mr. J. H. Swiney, Belfast, to report on the various schemes which had been propounded, in conjunction with Mr. Dorman, and these engineers reported in favour of the Bann scheme, with a suggestion, however, that it might be possible if Banbridge joined hands to obtain a supply from the Shimna River, situated in the Mourne Mountains. This suggestion was immediately taken up, and the engineers were instructed to report on the feasibility of obtaining a supply from this source. In March, 1900, their report was issued, strongly advocating the head waters of the Shimna River for supplying both Portadown and Banbridge with water, and submitting figures which showed that not only in the matter of the quality of the water, but also in the matter of cost per 1,000 gallons, this scheme was far superior to any yet submitted for Portadown. On consideration of the report the Portadown Urban Council, recognising the great advantage to their town of obtaining a copious supply of unpolluted water, and on being assured by the engineers that there was no engineering difficulties in the way, decided to invite Banbridge to co-operate with them in carrying out the project. To this the Banbridge Urban Council agreed, and both Councils then applied to the Local Government Board to constitute them a Joint Waterworks Board under the Irish Public Health Act. In January, 1902, Mr. Cowan, Chief Inspector to the Local Government Board, held an inquiry into the merits of the scheme, and on his report the Local Government Board granted the order constituting a Joint Board for the two districts, which was subsequently confirmed by Parliament. It became, however, necessary to obtain a further Provisional Order to enable the Joint Board to obtain possession of the land required for the carrying out of the scheme, and, after considerable opposition before a Committee of the House of Commons, this Order was confirmed in 1903. The chief features of the scheme were as follows:—The acquisition of a catchment area in the Mourne Mountains at an elevation varying from 900 to 2,300 ft. about sea level, and the interception of the head waters of the Shimna River collected off this catchment area by means of a dam thrown across the river at a place known as the Deer's Meadow, in Foffanyreagh, and the construction of a storage reservoir to hold 75,000,000 gallons, the laying of a 10-in. main from this reservoir to Drumnahare, situate about one and a half miles from Banbridge, where a service reservoir had been constucted to hold 300,000 gallons for the supply of Banbridge. From there a 9-in. main conveyed the water for the supply of Portadown to Drumclogher, about one and a half miles from Portadown, where a second reservoir to hold 1,000,000 gallons had been built. The further works included in the scheme the laying of the usual service pipes in the towns of Portadown and Banbridge, with all necessary fountains, hydrants, and scours, etc. The catchment area embraced an area of about 943 acres, situated for the most part on a granite formation, but in parts on silurian rock. There was not a single habitation on the area, which was composed of steep and barren slopes of very little value, even for sheep grazing, so that the supply was unpolluted from animal sources, and it would therefore be practically impossible to get a purer supply anywhere. As regarded the quantity available, the average mean rainfall over the area was estimated at 70 in., but, in order to be perfectly safe, the mean rainfall was assumed to be only 55 in., which gives for three consecutive dry years 44 in., and, allowing 12 in. for evaporation, allowed 32 in. as the quantity available, which, from 943 acres, would give a supply of 1,886,000 gallons per day. As the present population to be supplied was only about 15,000, and the consumption estimated at 30 gallons per head, or 450,000 gallons, it was evident that the supply should be ample for many generations to come. The joint board had acquired all rights to the water derived from their catchment area, the only proviso inserted in the Provisional Order being that the Board should allow the town of Newcastle to take a supply from this source, on terms to be agreed on, if at any time they desired to do so. Newcastle, however, was not likely to avail itself of this privilege, as there were other sources more convenient to Newcastle from which an abundance of equally good water could be obtained for that town. The embankment of the storage reservoir rested, for the most part, on boulder clay, with a large

admixture of stones and of gravel in the lowest part of the valley next the river. It was being constructed of earth, etc., with a puddle core. The total length of the embankment would be about 800 ft.; it would be 15 ft. at the top, with side slopes of 2½ to 1 and 2 to 1; its greatest height from the bed of the stream would be 48 ft. The top of the bank would be at the level of 959 ft. above Ordnance datum. The inner slope would be covered for the upper one-third with hammer-dressed pitching, 12 in. of shingle, the middle one-third with pitching 9 in. thick on 9 in. of shingle, and the bottom with a layer of shingle 18 in. in depth. The service reservoir at Drumnahare had a capacity of 300,000 gallons; it was 80 ft. by 80 ft. at top, and 47 ft. 6 in. by 47 ft. 6 in. at bottom, with rounded corners. It was 15 ft. in depth, with a maximum depth of water of 12 ft. Both floor and side slopes were composed of concrete rendered with cement mortar. The Drumclogher reservoir was also constructed of concrete; it was 118 ft. diameter, total depth 18 ft. 6 in., and maximum depth of water 16 ft.; the concrete in floor was 12 in. thick, and the circular wall 4 ft. 6 in. thick at bottom and 2 ft. at top; it was all rendered with cement mortar, as in the case of Drumnahare reservoir.

*County Road Maintenance in Ulster.*

Mr. J. W. Leebody, County Surveyor, County Tyrone (S.), read a paper on "County Road Maintenance in Ulster." He said the Local Government (Ireland) Act, 1898, which came into operation on April 1, 1899, transferred all the fiscal work of the Grand Juries to county and district councils. Each county was divided into rural districts, which for road and other purposes were quite distinct. The rural district councils consisted of two members elected to represent each district electoral division, together with three co-opted members, if the elected members so decided. The county council consisted of one member elected by each county electoral division, together with the chairman of each rural district and two co-opted members, if it was so decided. In the matter of roads, a county council had no power of itself to initiate any expenditure whatever, except in the case of repairs to "sudden damages," where, on the certificate of the county surveyor that the repair could not be delayed without prejudice to the public, repairs to the value of 50*l.* might be carried out. The district council was the starting-point for all road expenditure, and its functions might best be illustrated by following an application involving the expenditure of money through its various stages. District council meetings were, as a rule, held quarterly, but if a county council by a two-thirds majority so resolved, the Local Government Board might sanction half-yearly meetings. Applications for work might be made by any councillor or by the county surveyor. Generally speaking, councillors' applications were for new work, the county surveyors' applications being confined to the maintenance of existing works. Each application must state clearly what it was for, how much it was likely to cost, and the source from which it was proposed that the money to defray the cost should come. Councillors' applications must be lodged with the clerk of the district council on or before a date fixed by the county council at least twenty days before the district council meeting, the date of which was also fixed by the county council. County surveyors' applications would be lodged at any time up to the hour of meeting. At the meetings the various applications were considered seriatim, and if approved—with or without modifications—they became "proposals." The district council had, however, no power to increase in the "proposal" the amount of money set forth in the "application," and in the case of new work, if the amount required exceeded 50*l.* the proposal could only be passed "provisionally" in the first instance, and must come up for consideration at the succeeding quarterly meeting. After the meeting a list of "proposals" was published, and tenders were invited on behalf of the county council, except in cases which involved the acquisition of land, in which case the land must be acquired before any tenders were invited. Tenders were opened at the adjourned quarterly meeting, and lists of the various "proposals" together with the accepted tenders and bonds were then sent to the county council for consideration, but its functions as already indicated were limited to the approval or rejection of the proposals, and it could not consider a "provisional proposal" at all. It might, however, suggest modifications to the district council, and, in the case of new work, might hold over its final decision for a period of three months to enable further particulars to be furnished. Following on the lines of the Grand Jury system, it was originally intended that all road maintenance should be executed by contract only, although, in the case of masonry work, direct labour might be employed, but that had been modified, and, since 1901, provided a road had been included in a "direct labour" schedule at intervals of three years. Where no tender had been received for a proposal sent forward by the district council, the county council might put the work into the hands of the county surveyor for a period not exceeding twelve months, the sum to be expended not to exceed that mentioned in the proposal—whether it was scheduled for "direct labour" or not. By the Act the amount of money which any particular district council could devote to road maintenance in any year had been fixed at a figure, being 25 per cent. in excess of the sum which the Local Government Board certified to have been the average yearly expenditure during the three years before the passing of the Act of 1898. The total annual sum available for road maintenance and improvement was 343,218*l.*, and approximately the amount expended was 337,857*l.* One could not help feeling that somewhat better results than were actually found might be got for the money. Since the passing of the Act the number of urban districts had been increased to thirty-nine. This had not been at all to the advantage of the roads now included in the urban areas, as in most cases their total valuation was so small that it would be necessary to levy a prohibitive rate in order to maintain the roads in accordance with modern ideas. The mileage of roads kept under constant maintenance by the county councils was 18,307, at an average cost per mile, varying from 30*l.* in County Antrim to 10*l.* in County Donegal. In Donegal, Monaghan, and Cavan there was a considerable additional mileage which was only repaired at intervals. To administer this mileage and expenditure there were eleven county surveyors and sixty-five assistants, together with three specially-qualified assistants, viz., two in Antrim and one in Down. At the present time the roads were maintained entirely under the contract system in seven counties, while in two counties both the direct labour and contract systems were in force. Under the contract system a person who, in ninety-nine cases out of a hundred, was a small farmer, undertook to supply the necessary material and labour required to keep a particular road in order for a period not exceeding seven years in accordance with a specification approved of by the district council. There were 10,222 such contracts in force in Ulster at the present moment, the average duration being for a period of three years. When it was remembered that each of these contracts must be inspected at least four times each year, it would be seen that the time of the staff was pretty well occupied. In most of the counties the amount of competition for these contracts was extraordinary, and in the good old days the way in which prices were "cut" was past belief. To such an extent was this carried that frequently the idea of keeping the road in order appeared to have been entirely forgotten, and many a man became contractor for roads which he had never seen, and never intended to see. The author was happy to think that that state of affairs had pretty well disappeared, and public opinion, which in former days rather enjoyed the fun of seeing the county "done," had awakened to the fact that the fun had got to be paid for. In Antrim about ninety miles of road were being worked by direct labour, while in Armagh a scheme embracing 493 miles came into operation during the month of April this year. There was undoubtedly a very strong prejudice in Ulster against direct labour. It was admitted that road contractors could make a handsome legitimate profit, in spite of the fact that very few of them possessed the appliances, capital, or the business training necessary to carry out the work to greatest advantage. Why the general ratepayer, as represented by the district councillors, should raise objections to turning the profit to his own advantage was mysterious. There was also the feeling that money spent in supervision was money thrown away (and admittedly the success of direct labour depended on efficient supervision), but why this feeling should exist, seeing that every successful farmer was a living proof to the contrary, was equally mysterious. In some cases the explanation was that the majority of the district councillors were relatives or intimate friends of contractors, but this by no means explained all cases. While the author could not clear up the mystery to his own satisfaction, he was firmly convinced that a well thought-out scheme of direct labour working side by side with the present contract system would tend to economy, and would rapidly improve the conditions of the roads in every county in Ulster.

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Mr. Cartwright (Bury) said he approved of a good deal of the detail work set forth in Mr. Dorman's paper. There were one or two points which varied from his own practice. One was the slope of the embankment, which seemed rather steep; but, of course, that depended very much upon the material. He had no experience of using a scraper for passing through a new main; it was generally used for cleaning old pipes, but it was a very good idea to use it for that purpose because it frequently happened that material was left in the pipes, even with the greatest care. The previous week he had a piece of timber taken out of a main which had been in for seven years, which showed the necessity of doing something of this kind.

Mr. R. H. Dorman (County Surveyor of Armagh) said the present system of road maintenance in Ireland was corrupt and extravagant. The system of giving the work out to contractors for a period of from one to seven years gave them every opportunity of swindling the county and hoodwinking the county surveyor.

Mr. Munce (Belfast) agreed as to the fraud practised by road contractors. The system was an incentive to fraud, and the sooner a change was made the better.

Mr. Birkett (Fermanagh) said there was no doubt direct labour was the right thing, but in Fermanagh it would be a difficult thing to have direct labour without excessive cost. Except on a few main roads, direct labour would double their expenses.

Mr. Guilbert (Guernsey) proposed a vote of thanks to the authors of the three papers.

Mr. Nicholson Lailey (Trowbridge) seconded the vote of thanks.

Mr. Adams (Chippenham) said it was rather an eyeopener to some of them as water engineers to see that, even with an evidently well-engineered scheme, what large material could get accidentally into water-pipes. It occurred to him that in some of the districts he had to look after with some of the low pressures it would be difficult to get a scraper so successfully through the mains without having cut out and put in short pieces of pipe, which was a very expensive thing to do.

The President assured them it would be a great advantage to the Irish members if these meetings were held more frequently. In England they found the advantage to be very great indeed. They were able to see each other's methods of doing work, to see experiments which were being made in various directions by other engineers, and they got a good deal of information on every subject with which the engineer had to deal.

The members visited the sewage outfall and disposal works, where Mr. Cutler is making experiments with various forms of mechanical distributors and bacteria beds, and the pumping-station, fitted with electrically-driven centrifugal pumps. Mr. Cutler entertained his *confrères* to luncheon, and the afternoon was devoted to a visit to the sewage-disposal works which Mr. Midgley Taylor, of Westminster, is carrying out for the treatment of the Lisbury sewage.

On Friday evening the members travelled to Newcastle, Co. Down, where the papers were discussed on Saturday morning. Afterwards a visit was paid to the works of water supply for Portadown and Banbridge which Mr. Dorman and Mr. Swiney are carrying out, and which are described in Mr. Dorman's paper. Mr. Dorman entertained his colleagues to luncheon on the works.

## THE ROYAL SANITARY INSTITUTE.

THE dinner of the Royal Sanitary Institute was held on Wednesday, May 15, in the Langham Hotel, Portland-place, W., His Grace the Duke of Northumberland, K.G., President, in the chair. There were also present:—Mr. H. D. Searles-Wood, Chairman of Council; Sir Aston Webb, R.A.; Major-Gen. Right Hon. Lord Cheylesmore; Major-Gen. Sir T. Fraser, K.C.B., C.M.G.; Sir Lauder Brunton, LL.D., F.R.S., President, International Congress on School Hygiene; Sir Francis Sharp Powell, Bart., M.P.; Sir James Crichton-Browne, LL.D., F.R.S.; Col. J. Lane Notter, Sir Henry Tanner, Col. Scott Moncrieff, Sir Shirley F. Murphy, Sir Alexander Binnie, Sir J. MacFadyean, Surg.-Gen. Sir A. Keogh, K.C.B.; Dr. Louis Parkes, Dr. S. Rideal, and Messrs. G. H. Anderson, Chairman, Sanitary Inspectors' Association; H. Adams, T. W. Aldwinckle, H. P. Boulnois, T. W. Cutler, A. Wynter Blyth, H. T. Hare, S. Pallitzer, W. Kaye Parry, J. T. Taylor, H. A. Roechling, J. Slater, A. Saxon Snell, J. Osborne Smith, W. C. Tyndale, E. White Wallis, Secretary, and others.

The loyal and patriotic toasts having been honoured,

Sir T. Brooke-Hitching, Mayor of St. Marylebone, proposed "The Houses of Parliament," and in the course of his remarks he reminded his audience how much we are indebted to the House of Commons for passing measures of sanitation which are for the benefit of the people.

Major-General the Right Hon. Lord Cheylesmore and Sir Francis Sharp Powell, Bart., both responded.

Sir F. Sharp Powell said that in the House of Commons they had much to do with public health. The housing of the people was an old story which he believed would bring in each generation problems of its own. They had now come to this point in the development of the housing of the people that they did not confine their considerations to the purely and merely sanitary condition of the people. Many of our large towns had now been practically built under the operation of by-laws, and the health of the people in the comparatively new districts was, with due care and attention, in a safe condition. But we were looking now to something—he would not say beyond health, because, except religion, he knew of nothing which was beyond health; but he looked to the elevation of the people in taste and culture, and he was glad to see in our towns the multiplication of parks, the extension of the means of recreation, and those many improvements which stood not only for physical health, but also for the moral elevation of the people. As to the prospects of the session, he thought he could say that we have in Mr. Burns one whose heart and soul were devoted to the improvement of the physical condition of the people. As to the connexion between health and education, we had heard from our youngest days of the importance of a healthy schoolroom, and much had been wisely said as to the importance of sanitary conditions in our schools; but it was only within the last few months that we had fully recognised, and placed our recognition on the pages of the Statute-book, the connexion between feeding the children and their education. We had our reward in what we did for public health; we had our reward in the improved health of the people, and also in the extension of wider knowledge amongst the people.

The Chairman then proposed the toast of the evening, "The Royal Sanitary Institute." He said he knew of no subject so barren for a speaker as that of a truly prosperous society, for it was very much easier to speak of a society which was in low water, which was going from bad to worse, and it was easier to make pathetic appeals in such circumstances than to speak of a society which from year to year went on in its useful course without any very marked vicissitudes, but, on the contrary, progressing as it became more and more prosperous day by day. They had to congratulate themselves that their work was not only useful, but that it was recognised by the public as being useful. As an instance of that he could remind them that the Secretary of State for War in one of his recent speeches in Parliament mentioned the value which their examinations had been, and complimented them on the admirable way in which those examinations were conducted. The Institute had had great encouragement in the spread of their Colonial examinations, and the responses with which their efforts had met with in the Colonies had been considerable. Australia was one of the first, if not the first, to welcome the efforts of the Institute in the matter of Colonial examinations. He was delighted to know that Parliament was directing its attention to so many subjects, and they would watch the course of the various proposals with interest. The Institute gave a prize this year—the Snell prize—which was won by two candidates, and he thought they might congratulate themselves upon the fact that candidates had come forward whose excellence was such that it was hard to distinguish between them. The subject set for the prize was: Suggestions for Improvements in Sanitary Appliances for Use in Workmen's Dwellings and Labourers' Cottages under the Varying Conditions of Water Supply and Drainage, and that was a subject of extreme importance just now, when there were so many proposals for bringing people back to the land and increasing the number of small holdings and properties. One of the great difficulties—and there were a great many difficulties in connexion with the subject—was how they were to furnish at a reasonable price the dwellings in which the small holders or proprietors were to live, and it was a problem which he thought had not been quite solved, and he thought it would require a good deal of attention on the part of those who took an interest in sanitation to see that we did not sacrifice the sanitary aspect of the question to economy or the desire to increase this form of property. He had been travelling within the last month in Europe, in a country where sanitation was on the increase, but where drainage had been unknown; and as far as he could make out the impression the desire for sanitation had made on the human mind in that part of the world had induced the people to inaugurate water-carriage for drainage within the dwelling, but not outside; and that was a condition of affairs which was not very much better than the old system of no drainage at all. He was rather shocked by what he discovered, and he was more impressed, if possible, than before he left England as to the necessity for sound teaching on matters of sanitation. It was a source of gratification to the Institute that they were in the position of being able from time to time to add to their capital, and at the same time to spend practically the whole of the fees which they obtained upon education, and thus they were really and truly carrying out the work for which the Institute was formed. With the toast he coupled the name of Mr. H. D. Searles-Wood, who had just taken up the office of Chairman, and he congratulated them upon their choice, and, in conclusion, he referred to the deep debt of gratitude they owed to Col. Notter for the work he had done as Chairman in the past.

Mr. Searles-Wood, in reply, said they had assets exceeding liabilities to the amount of 5,700*l.*, which, as they were not a money-making institution, was a very satisfactory state of affairs. This does not include the building fund of 12,000*l.* As to the work of the Institute, he should like to refer to the number of candidates who came up for the examinations. They had no less than 800 candidates yearly who came forward for the 3,000 appointments that the examination qualified them for. It might be said that they were overstocking the market and that they ought to be more careful in their examinations, so as not to produce so many passes, the great majority of which must suffer serious disappointment; but he thought there was another view to take, and that was that each one of the candidates who came forward had his attention drawn to the elementary principles of hygiene necessary to the preparation of the examination, and that each became a missionary in his or her family circle, and if they thought of the advantage that was to those who endeavoured to qualify year by year they would see that the result was, to spread these elementary principles all over the country in a way in which the Institute could not hope to reach by their sessional meetings, their Parke's Museum, or in any way he knew of. They had every hope that they would go on and prosper, and one satisfactory future arrangement was the conference which they proposed to hold in Dublin in the coming month. About 139 authorities had appointed delegates.

The concluding toast was "The Visitors," which was proposed by Sir Aston Webb, R.A., who said that Sir Francis Sharp Powell had referred to several of the Bills before Parliament which interested the Institute, but he did not refer to one which Mr. Burns proposed to introduce, although he had not yet done so, *i.e.*, a Bill which was to regulate, to some extent, the development and the organisation of the extension of the towns of the country. He could not think that any Bill could be more important to the hygienic interest of the country than that dealing with regulations to be formulated to insure that our cities were increased on some recognised and organised plan. He understood that the Bill would suggest some means by which open spaces might be secured in future developments; that broad streets might be formed; that fitting spaces for dwelling with sufficient air space round them might be provided; and that the admission of sun and air might not be forgotten. It seemed to him that prevention was better than cure, and although such proposals might not influence towns already built, it might secure that in the future those evils of overcrowding, of squalor, and misery, which were such a disgrace to our towns, might be avoided in the future extensions.

Sir C. Watson, in reply, referred to what the War Office had done for sanitation, and said that it had done more for the Army and the civil population than people had any idea of. It was the War Office and not civilians who started the great sanitary movement of this country. If sanitation was carried out to its full extent, there would be no need for doctors.

### EASTBOURNE MEETING.

The Institute held a provincial sessional meeting at Eastbourne on Saturday last week, some forty delegates being present. The Mayor (Alderman H. W. Keay) first received the delegates in his parlour, and an adjournment was then made to the Council-chamber. The Chairman of the Institute Council, Mr. H. D. Searles Wood, F.R.I.B.A. (London), presided. The Mayor accorded the company a hearty welcome, and remarked that Eastbourne prided itself upon its sanitation and its officers. He spoke of the difficulty with which the town's sewerage work was attended, but added that the success of the scheme compensated for all trouble.

The Borough Engineer of Eastbourne, Mr. A. Ernest Prescott, contributed a paper entitled "The Main Drainage of Eastbourne," and entered fully into the system now in use. He said the provision of good drainage and pure water was two of the most important duties devolving upon local authorities, but more especially did this apply to seaside and other visiting resorts who catered for the health and pleasure of numerous visitors. The good name and reputation of a visiting resort was chiefly in its sanitation, and, this desideratum once achieved, it must at all costs be retained, and that by the introduction of modern sanitary science. The larger portion of the main drainage of Eastbourne was of comparatively recent date. Before the year 1881 the town was drained by gravitation, but owing to its rapid development it was found necessary to supplement the then drainage by extending the main sewers in various parts of the town. Owing to a large area lying at a low level, and being subject to flooding, a scheme of pumping was resorted to, and the town was divided into low and high areas. In 1894, the provision for the main drainage of the town was again found to be inadequate, and the late Mr. Henry Law, M.Inst.C.E., designed a scheme for extending it, for the prevention of flooding, and for making provision for the future growth and development of the borough. The town was now divided into separate areas, viz., a high-level area with an approximate acreage of 772 acres, and a low-level area of 543 acres. Mr. Prescott concluded with a reference to the late Mr. G. A. Wallis, who designed the first portion of the main drainage, and the late Mr. Law, who was responsible for the extension in 1894, which latter work cost 81,000*l.* His experience gave him some knowledge of the loose and waterlogged condition of the ground which had to be dealt with during the construction of the work, and it was sufficient testimony to the engineering skill and ability which his predecessor, Mr. R. M. Gloyne—who supervised the work—brought to bear in the execution of

the scheme, when he stated that it had done its work efficiently and well, and had thus far stood the test of time.

Mr. Gloyne (London) proposed that the hearty thanks of the delegates be accorded Mr. Prescott, and spoke generally of the drainage of Eastbourne. He stated that there had been no trouble about the expenditure on drainage matters on the part of the Council or townspeople, and to its excellent sanitary condition Eastbourne owed much of its prosperity.

Mr. W. Kaye-Parry, M.A., M.Inst.C.E., F.R.I.B.A. (Dublin), seconded. He stated that at Eastbourne difficulties had been successfully overcome, and the results achieved were instructive to engineers who had similar problems to deal with in other places. Eastbourne was pointed to by engineers as one of the most successfully-drained towns in the kingdom.

Mr. A. E. Nichols (Folkestone) and others also briefly spoke, and, in acknowledging the vote of thanks accorded him, Mr. Prescott answered several questions.

After the meeting the delegates lunched at the Grand Hotel, and subsequently conveyances, provided by the Mayor, took the company to view the air-compressing machinery, the main ejector-station, and the general working of the pneumatic sewage system. The destructor, electric light works, and the motor-omnibus station were visited *en route*, thus providing a wide field of interest for the members. The drive was continued to the sewer outfall at Langney Point, where also an interesting example of coast erosion was seen in the gradual dismantling by the sea of a fort. The steps that are being taken to prevent further erosion at the outfall was also shown. The drive concluded with a visit to the Isolation Hospital on the Downs, tea being partaken of there.

Dr. W. G. Willoughby efficiently acted as local secretary, working in conjunction with the general secretary, Mr. E. White Wallis.

## Builders' and Contractors' Column.

### Foundation Work in Wet Ground.

A somewhat unusual method of getting rid of water from soil in which trenches have to be excavated for the foundations of masonry structures is to lower the underground water level by means of a series of tube wells, thus permitting the foundation work to be executed in dry earth.

Those who have had experience in connexion with water supplies from wells are familiar with the fact that the effect of continued pumping, especially in dry weather, is to cause a conoidal depression of the water level around the well. Architects are aware also how dangerous it is to conduct pumping operations in the neighbourhood of buildings, for the removal of sand and fine material is certain to result in settlement of more or less serious character according to circumstances. For this reason the method described below should only be adopted with the greatest caution and with such safeguards as are necessary for preventing disturbance of the subsoil.

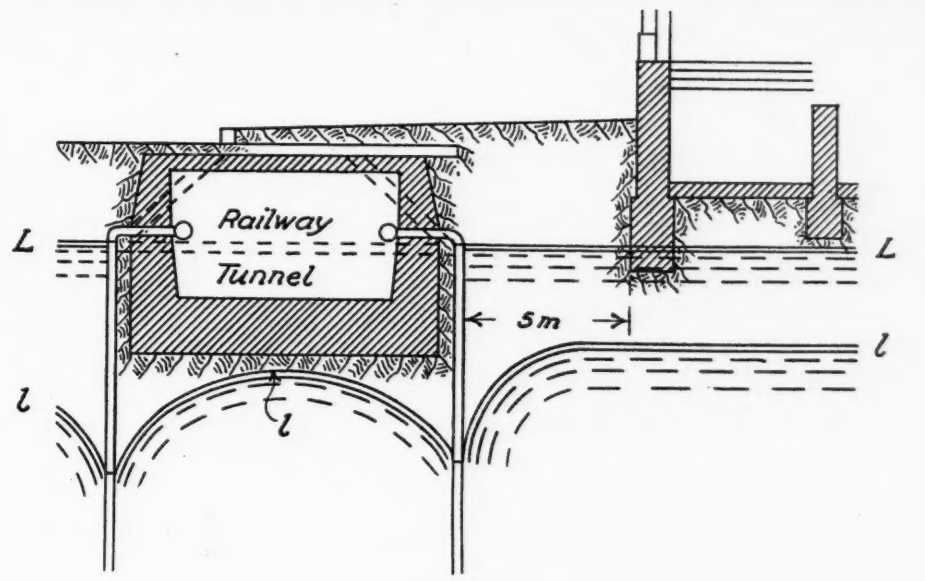


*Fig.* 2.

Fig. 1 illustrates the principle as applied in the extension of the Berlin Metropolitan Railway to Charlottenburg. Five tube wells, $t_1$ to $t_5$, were driven and connected with a common suction-pipe, P, connected with a centrifugal pump. By continued pumping, the water level, originally at L, was lowered so that it followed the curve *l*, and a trench, parallel to the line of boreholes $t_1$ to $t_5$, was then excavated in the drained soil. Five other tubes, $t_1'$ to $t_5'$, were next driven and connected at the top by the common suction-pipe $P^1$, provided with a second centrifugal pump, by the aid of which the water level was further reduced, as indicated by the curve $l^1$. The trench was next excavated as far down as the extent of the drained earth, and the first five tubes were driven at the lower level, indicated by broken lines in the drawing, connected up as before, and used to lower the water level to $l^{11}$.

By applying the two sets of apparatus in a similar manner along the line of tunnel to be constructed, the workings were kept perfectly clear of water. It should be stated, however, that each set of apparatus was in duplicate so as to drain the earth at either side of the excavation.

As shown by Fig. 2, the railway is situated very near to street level, the actual distance between the under side of the roof and the ground varying from about 0·70 metre to 1 metre. It was constructed entirely by open excavation, for the greater part of the route in water-bearing sand, the other material encountered being an impermeable argillaceous conglomerate. Along each side of the trench to be cut, tube wells were sunk, as indicated in the section, each tube being provided with a strainer-box to prevent the abstraction of sand with the water pumped out. The original water level is indicated by the line L, and the lowered level by the curves *l*. After completion of the subway the water level would soon be restored to its normal height, no doubt to the mental relief of those owning house property along the route. However, it does not appear that any injury was caused, and we understand that the authorities considered the method to be less likely to affect adjacent buildings, and at the same time to be more economical than the use of cofferdams and pumps in the usual manner.

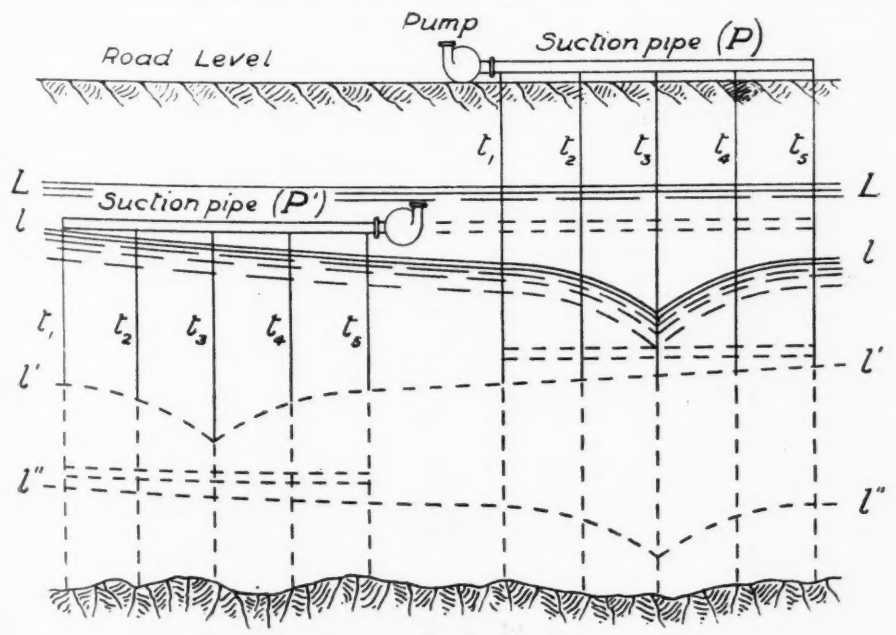


*Fig.* 1.

A second work illustrating the employment of the same system is the terminus of the Paris Metropolitan Railway at Menilmontant.

The terminus comprises an arrival station beneath the Rue Belgrand, a departure station beneath the Avenue Gambetta, a connecting tunnel passing under the Square Tenon and the Rue de la Chine, and extensions of the tunnels beneath the two first-mentioned streets for the accommodation of rolling stock. (See Fig. 3.)

In the Menilmontant district of Paris the subsoil consists chiefly of gypsum, but under the Avenue Gambetta and the Rue Belgrand this formation has been washed away, and replaced by a mixture of the upper strata, in which sand predominates. The gypseous marls, more or less disintegrated at the surface, form the bottom of a hollow filled with argillaceous earth and fine sand permeated with water, clay predominating beneath the Avenue Gambetta, and sand beneath the Rue Belgrand. The fine sand, saturated with water, forms a semi-fluid mass, in which it would be very difficult to build the foundations and walls of a railway tunnel.

Instead of forming cofferdams in which to conduct the work, or of resorting to ordinary methods of draining the sand, it was decided to lower the underground water level practically in the same way as that adopted in Berlin. The construction of a cofferdam by driving heavy piles is certainly undesirable in comparatively narrow streets, owing to the inevitable noise and vibration attending such work. Again, ordinary methods of dealing with water in the trenches would probably have led to the washing away of sand from beneath the foundations of adjacent buildings, among which are the Hôpital Tenon, containing nearly a thousand beds, and the Mairie of the XXth Arrondissement.

The first portion of the work undertaken was one wall of the tunnel along the Rue Belgrand on the side next to the hospital. It was necessary to carry the foundations of this wall well into the clay so that the completed wall should form an efficient barrier to the flow of underground water.

Fig. 4 is a section of the railway on the Rue Belgrand, the left-hand side being that next to the Hôpital Tenon. The wells

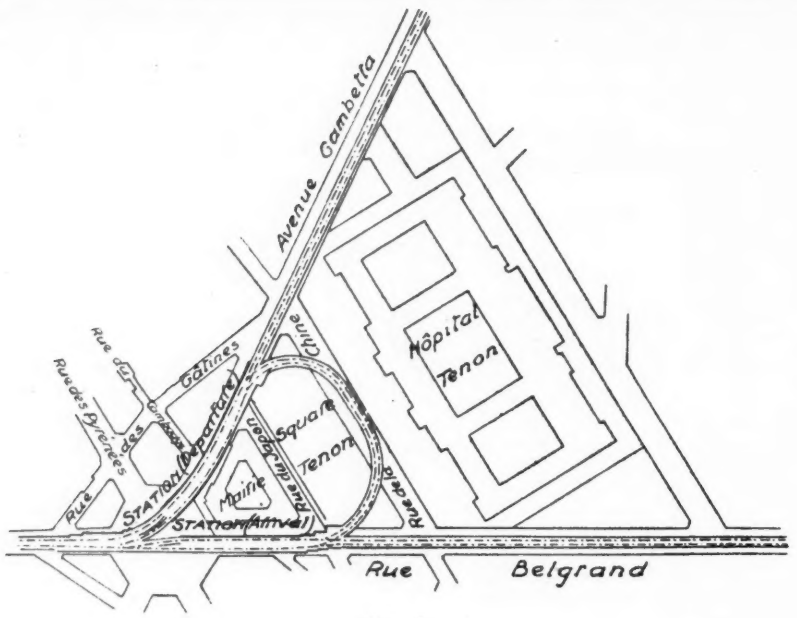


*Fig. 3.*

sunk for drainage and building purposes were situated about 6 metres apart, centre to centre, along the line of the wall to be built, in the middle of each well being a bore tube 30 centimetres in diameter, which was sunk lower and lower as the depth of the well increased, and ultimately reached the depth of 1·50 metres below the surface of the underlying clay. These tubes served the purpose of sumps, and in them were installed suction-pipes connected with small pumps operated at surface level.

The walls of the wells were held up by timbering, framed on the surface and lowered into position as the work of sinking proceeded. In the lower part of the excavation, however, it became necessary to employ stouter timbering, consisting of a double layer of planks, one layer breaking joint with the other, in the hope of preventing the influx of sand and water. The bottom of the excavation was similarly lined. However, in spite of the fact that the joints were carefully caulked, sand found its way into the wells, and spaces were formed behind the timbering. To avoid any injurious effects, these voids were filled in with earth as soon as their presence was detected.

As soon as each well had been sunk to the required depth, a section of the masonry was built, including the foundation, the wall, and one haunch of the arch, as shown in Fig. 4. Then, owing to the lowering of the water level, it became possible to build the connecting portions of the work in open trenches between the wells first sunk.

The retaining wall at the left-hand side of the Rue Belgrand, having been constructed in this manner, the flow of water was so far diminished that there was no difficulty in building the wall at the right-hand side of the tunnel in ordinary galleries in sections of from 12 metres to 18 metres long. When the side walls had been completed, the intermediate core of sand, being then dry, was readily removed, and the remaining portions of the work, comprising the construction of the arched roof and the invert, was performed without the least difficulty.

### Railway Companies and Cartage Allowances.

The decision given by the Railway Commissioners on Saturday last in a case brought against the London and North-Western Railway Company by Messrs. Pickford, the well-known carting agents, is of even more importance to many of our readers than the general question of rebates, upon which we commented recently. It was originally sought to compel the railway company to set out separately in their rate-books the amount charged for conveyance, exclusive of the charge for cartage; and when this was done (by order of the Commissioners) the applicants complained that they were receiving an insufficient allowance from the company by way of cartage rebate when they (Messrs. Pickford) performed this service. The Commissioners, however, decided that it was not proved that the complainants were prejudiced by the action of the company, and declined to make any further order. It is not surprising that this judgment, although supported by elaborate and ingenious legal argument, was not unanimous, Sir James Woodhouse expressing, "with diffidence and regret," his disagreement with his colleagues. His conclusion was that the company had not disproved the contention that the rebate for cartage did not always, in fact, represent the amount included in the rate for cartage. The Acts regulating railway rates practically left the companies a free hand in this particular matter, except that no manifestly unreasonable action is permitted; and, while the rebates allowed may not, as a rule, be inadequate, any trader performing his own cartage should always be certain of getting, without any question, an allowance corresponding with the sum which has been included in the rate to cover that service.

### Porous Slabs of Plaster.

Slabs made of plaster with the admixture of sawdust, cinder, or other substances, are already known and extensively used in building construction. The latest idea for increasing the sound-resisting properties, without impairing the strength and durability, of such slabs is to mix with the plaster a small proportion of some unstable carbonate which readily gives up carbonic acid gas while the plaster is setting. The gas is evolved slowly and gives a porous texture to the slab, just as the addition of baking-powder, bicarbonate of soda, or carbonate of ammonia lightens bread and pastry. According to the *Allgemeine Chemikerzeitung*, the following are suitable proportions for the ingredients:—

| | |
|---|---|
| Plaster of Paris | 40 lb. |
| Water | 39 lb. |
| Bicarbonate of soda or carbonate of ammonia | 1 lb. |
| Sawdust | 20 lb. |

The alkaline carbonate is first dissolved in the water, which is then used in the usual manner.

### Miscellaneous.

The City Council of Seattle, Washington, U.S.A., one of the most progressive municipalities on the Pacific coast of America, recently passed an ordinance empowering the City Engineer to negotiate for the erection of a large destructor plant of the Meldrum Simplex type. The order for this plant has now been placed with Messrs. Meldrum Brothers, Timperley, near Manchester. The City Engineer, Mr. R. H. Thomson, visited Europe in the spring of 1905, and inspected various destructor installations in this country and on the Continent, finally selecting the Meldrum destructor. This type of destructor is claimed to be in advance of any American type; and recently the city of Paris contracted for the erection of similar destructor plants at three large stations, the total capacity of these furnaces approximating 700 tons per day of twenty-four hours. In addition to the orders in hand for Seattle and Paris, Messrs. Meldrum Brothers, Ltd., have also contracts for St. Etienne, France; Brussels (St. Gilles), Belgium; Pretoria, South Africa; Prahran and Lithgow, Australia; and in the United Kingdom for the municipal authorities of Southport, Felixstowe, Barnes, Pontefract, Manchester, Chepping Wycombe, etc.; whilst for the large shipbuilding works of Messrs. Harland & Wolff, Ltd., Belfast, they are installing a large destructor plant to deal with dockyard and works refuse, on similar lines to that installed for H.M. Dockyard, Chatham.

Small destructor plants are now being extensively adopted for dealing with the dressings, poultices, and other waste matter accumulating at hospitals, infirmaries, and similar institutions, and it is becoming a general practice for architects and engineers to specify a destructor plant when planning such institutions. Messrs. Meldrum have made a speciality of this type of furnace, and have supplied them to various authorities throughout the country. They have also received orders from the Crown Agents for the Colonies, the Natal and Siamese Governments, etc., and for an installation at the new Royal Infirmary, Manchester, for which

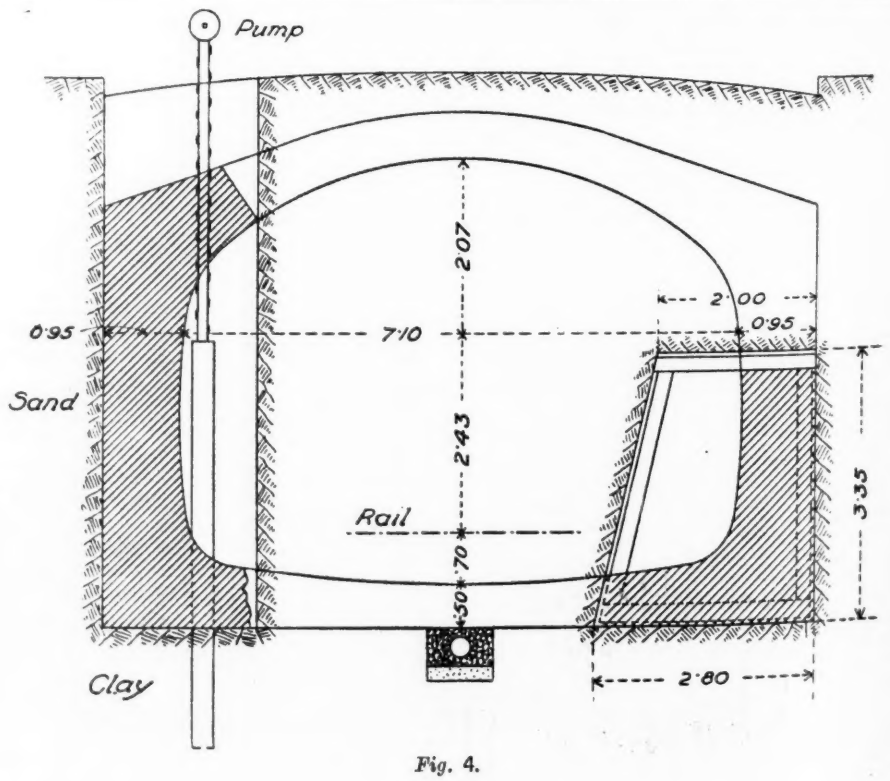


*Fig. 4.*

Mr. Edwin T. Hall and Mr. John Brooke are the architects.

The Royal Exchange Buildings, London, is gradually being completed so far as the structure is concerned. Messrs. George & Yeates are the architects, and Mr. Stoner, New Broad-street, the surveyor, and Messrs. Lawrence & Sons, of Waltham Cross, are the contractors. The whole of the stone has been supplied from the quarries of the Bath Stone Firms at Portland.

The military camp at Bovington, near Wool, Dorset, needing a larger water supply than was obtainable from ordinary wells, a deep artesian well has been bored. After passing through the various beds of drift, Bagshot sands, London and Reading clays, etc., chalk was reached at 280 ft., but in order to obtain the supply needed to meet the requirements of the camp a further 446 ft. had to be bored into the chalk formation, making a total depth of 726 ft. A copious supply, which rose to within 93 ft. of the surface, was then obtained, at the rate of over 70,000 gallons per twenty-four hours during exhaustive pumping trials. The work, including installing the permanent pumping plant, has been carried out by Messrs. Le Grand & Sutcliff, of London.

New almshouses are being erected at East Meon, Hants, for which local stone is being used, with dressing, copings, etc., in the Chelynch Bed Doulting stone and Portland stone steps from the quarries of the Ham-Hill and Doulting Stone Company. The new Mission Church of St. Augustine, recently illustrated in our pages, is being built with red brick and Doulting stone dressings from the Chelynch bed. The interior arcading is of wood, with Portland stone bases to the wood columns; also Portland stone steps from the same quarries. The builders are Messrs. Martin Wells & Co., Aldershot.

The interior of the tower of Casterton Church, near Kirkby Lonsdale, is being put in repair, and the order for a new clock with Cambridge chimes has been given to Messrs. John Smith & Sons, of Derby. The same firm have also received an order for a large clock with Westminster chimes to be fixed in the Parish Church at Rothwell (Northamptonshire). The clock is fitted with all the latest improvements, and has been made generally to the designs of the late Lord Grimthorpe.

Messrs. Potts & Sons (Leeds and Newcastle) are making a clock with four dials for the old tower of Ringley Church, near Manchester, which stands about 100 yds. away from the new church, erected at a later date, and is therefore in a very good position for acting as a clock tower.

The London Electrical Fittings Company have opened new fittings showrooms at 15, Newman-street, Oxford-street.

The Armorduct Manufacturers Company have purchased a building site of some 7 acres at Witton (Birmingham) for the erection of large new works, in which the whole of their manufactures will be concentrated.

## Books.

*Graphical Handbook for Reinforced Concrete Design.* By JOHN HAWKESWORTH, C.E., Engineer, with RAYMOND F. AITMIRALL, Architect. (London: Crosby Lockwood & Son. New York: D. Van Nostrand Co. 1907.)

THIS book contains fifteen plates, of conveniently large size and very clearly printed, giving various well-arranged curves for the design of concrete-steel beams, slabs, and columns. Each plate is preceded by a page or two of letterpress describing and illustrating the method of using the curves. All calculations are based upon the unit stresses prescribed by the Amendment to the Building Code of New York City, adopted on September 9, 1903, and have been made by formulæ which are set forth in the appendix. The unit stresses in question are not universally accepted by concrete-steel experts, but have been adopted by the author because his deliberate intention was "only to present a method of rapid designing, using unit stresses which fulfil the requirements of the Building Code of New York City." If it be desired to take lower or higher working stresses the user will have to employ factors for modification of the values read on the diagrams.

The methods of calculation employed by the author for beams and slabs are rational and trustworthy. Contrary to the hypothesis now generally accepted that the stress-strain curve is practically a straight line within the limits of working stresses he has adopted a parabola formula denoting stresses that are somewhat lower than those indicated for equal loads by straight-line equations. The object in view, as admitted by Mr. Hawkesworth, was to offset to a small extent the unduly low unit stresses assigned by the New York Building Code. This is a point that must not be lost sight of by users of the diagrams, and especially by those who may decide upon using higher working stresses than are contemplated by the code named.

We note with approval that the author has not made his computations on the basis of ultimate resistance, afterwards qualified by a factor of safety. That way of going to work seems to be favoured by American makers of various patented bars, no doubt for very satisfactory commercial reasons, but with the undeniable disadvantage that the so-called safe loads thus obtained may involve excessive stresses in either the steel or the concrete, or lower stresses than those reasonably permissible. In one case the result may be a risky design and in the other an uneconomical design. The method actually adopted in this book consists in taking as the basis of computation the maximum permissible loads and the actual bending moments caused thereby. The corresponding position of the neutral axis having been obtained, the moment of resistance can be computed so that the predetermined unit stresses in the steel and the concrete cannot be exceeded.

The formula used by the author for short columns with longitudinal reinforcement only is that in almost universal employment for members where flexure is not anticipated. We cannot blame Mr. Hawkesworth for using it, because at present nothing better has been published. When applied to columns where the ratio of unsupported length to the least side or diameter is not greater than 12, as prescribed by the Building Code of New York, the results are perfectly safe. The illogical character of the rule is illustrated by the fact that the calculated unit load for a column 144 in. long by 12 in. diameter is the same as for a prism 12 in. long by 12 in. diameter. To make the rule safe for columns with the maximum permissible value of the ratio the unit stresses for concrete and steel are usually taken at about 30 per cent. less than the stresses allowed for beams, thus involving progressively increasing lack of economy as the values of the ratio decrease.

Another objectionable practice generally followed is the use of the ratio length ÷ least diameter, which may be properly applied to solid homogeneous columns of square or circular cross-section, but is altogether inappropriate to columns of heterogeneous character, whose resistance can only be judged by considering the relation of length to the least radius of gyration. The reasonableness of this contention will be clear in a moment if the reader bears in mind the fact that the value of the radius of gyration is directly affected by the distance of the reinforcing bars from the axis of the column. However, in a work such as this, which does not profess to be a treatise on reinforced concrete, and, as before said, is based upon the New York regulations, the author has necessarily been obliged to follow current practice.

The plates given by Mr. Hawkesworth relate to the determination of moments of resistance, the design of slabs of different spans and load conditions, the spacing of square bars required to obtain a given area of reinforcement per foot width of concrete, the external bending moment in column footings, the moment of resistance per inch width of beams or slabs of various depths, the conversion of areas of reinforcement expressed in square inches per foot width into total areas for any given width, the position of the neutral axis for beams, the shearing resistance of various combinations of concrete and steel, the dimensions of columns having longitudinal reinforcement with and without hooping, and the complete design of a simple reinforced concrete structure.

These diagrams bear every trace of most careful preparation, and are far superior to any others that we have seen hitherto. Their object is to render architects and engineers, who may only occasionally be required to design concrete-steel structures, independent of expert advice, and particularly of that offered by contracting firms. Except for very simple structures, we should not advise designers to rely entirely on this or any other series of curves; not that we doubt the correctness of the results, but simply for the reason that the special problems almost always presented require special and expert knowledge for satisfactory and economical solution.

Take, for example, the case which very often occurs where the double reinforcement of beams is necessitated by architectural requirements, although theoretically uneconomical as compared with single reinforcement. The author gives no other assistance in this respect than to say that "the design should be carefully worked out by accepted formulæ for the special case involved."

We are strongly opposed to the idea that structural work can be safely designed by inexperienced persons even with the assistance of the best possible tables or diagrams, which may or may not be properly applicable to given conditions and which have to be taken wholly on trust by those who are not able to realise their full import. But in the hands of an architect or engineer fully capable of designing without the diagrams and of making such modifications in them as may be found desirable this book can be confidently recommended as a valuable labour-saving aid.

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*The Law of Building, Engineering, and Shipbuilding Contracts, and of the Duties and Liabilities of Engineers, Architects, Surveyors, and Valuers, with Precedents and Reports of Cases.* By ALFRED A. HUDSON, Barrister-at-Law. Third Edition. (London: Sweet & Maxwell, Ltd. 1907.)

THE first edition of this work appeared in 1891. In his preface to the second edition, which is dated October 15, 1895, the author states that the first edition had then been out of print for nearly a year, and now a third edition has just appeared. We refer to these dates because they speak for themselves, and are a sufficient testimony that the author, with the experience gained by him first as an architect and then as counsel, has produced a work acceptable to those concerned in the subject, both laymen and lawyers. The layman will perhaps be somewhat overawed by the size of these two volumes, which together comprise some 1,600 pages, but the bulk of the work casts no reflection on the author, but is rather a tacit comment on the legal system of modern times which, both by statute and case law, complicates the law on every subject. Thus, in the volumes before us, in the table of statutes 126 statutes are referred to, whilst in an excellently-arranged table of cases some 2,240 cases are tabulated as bearing on the subject-matter.

It is far easier to criticise a task of such magnitude as the preparation and compilation of this mass of matter than to carry it out; but in a standard work of this description, which is certain to run into many editions, we feel certain that any suggestions will receive careful consideration by the author, and we therefore venture to make one or two observations on the arrangement of the subject-matter in Vol. II. The first 458 pages of this volume are taken up with full reports of cases which are referred to in the notes to the precedents which occupy the second portion of the volume. These cases are not arranged alphabetically, and we are unable to discover any digest of the subject-matter they deal with. They can only be referred to by a reference, first to the notes to the precedents, and by then referring to the table of cases. The use of these reports of cases would, it appears to us, be enhanced by a digest of the head notes and an alphabetical arrangement of the cases. Both volumes are furnished with an excellent index, but, for the reasons given above, in Vol. II. the index has no direct bearing on the cases reported in full.

In dealing with commissions we find that the author has made no reference to the Prevention of Corruption Act of last year. The effects of this complicated statute are at present not fully understood, and no decision has yet been given by any superior court on any case within its provisions; but as it is directed to prevent corruption on the part of agents it would seem to have some direct

bearing on the relationship which exists between building owners, architects, contractors, and others, and the opinion of the author on the effects of this measure would have been of value.

This work is so well known and generally accepted that it is unnecessary for us to refer to its general characteristics. We need only say that this third edition is not likely to prove less successful than its predecessors.

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*Journal of the Royal Sanitary Institute.* February and April, 1907.

THE most interesting paper in the February number of the *Journal* is that by Dr. Williamson on the sewage-purification problem with special reference to sewage discharge into a tidal estuary. It was read at a sessional meeting at Belfast, and deals almost exclusively with the difficult problem in connexion with that city. The discharge of sewage into the loch has caused the growth of a kind of sea-weed, chiefly *ulva latissima* (or sea-lettuce), which is driven by the tides and wind on to the shores, where it decays and becomes a great nuisance. For some time past the Corporation have employed men to collect it, and are now considering the question of adopting bacterial treatment for the sewage, in order to reduce the amount of plant-food discharged into the estuary. It is somewhat curious that the valuable manurial properties of sewage should not only be lost to the Committee, but should be discharged into the loch in such a way as to promote the growth of a weed which becomes an almost intolerable nuisance. In the discussion which followed opinions were divided as to the possibility of effecting a cure by thus purifying the sewage.

In the April number two papers on sewage purification, both of which are of exceptional interest, are given. Mr. W. D. Scott-Moncrieff, in a paper on "The Bacterial Treatment of Sewage," gives the results of further work which he has done at Ashtead, Keithley, Staines, etc. Illustrations of the author's sewage-distributors and other apparatus are given, and also a valuable series of diagrams showing the progressive nitrification of the sewage at different depths of filter-beds. These diagrams are particularly instructive, and show that in many cases the filtering-beds have been made of too great a depth. The same point is brought out by Dr. George Reid in his paper on "The Nitrification of Sewage." His experiments at Hanley, in Staffordshire, showed that nearly the whole of the purification was effected in the uppermost foot in the depth of the filter, and, while he does not suggest that the depth of filters may be reduced to 1 ft., he does suggest the practicability (if a fine filtering medium is used) of reducing the total depth, including that required for the effluent drains and the coarse material on the top of them, to about 2 ft. 6 in. He lays great stress on the importance of fine filtering material, but, of course, in order to prevent this being clogged, the matter in suspension in the crude sewage must be removed by tank treatment.

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*The Country House; a Practical Manual of the Planning and Construction of the American Country House and its Surroundings.* By CHARLES EDWARD HOOPER. (London; B. T. Batsford; 1906.)

ONE does not understand exactly for whom this book is written; hardly for architects, it is much too popular in style for a professional book, and yet it gives many constructional details which are hardly what the general reader would trouble himself about. As an American book on American houses it is of course not entirely applicable to English conditions. It may perhaps best be defined as a literary essay on the whole subject of house-building from the American point of view.

As such it is an interesting and suggestive book, in which the subject is treated very completely, perhaps with an over-affectation of completeness, beginning the chapter on "selection of a site" with references to the possible tastes of the prehistoric man who roosted on trees and (subsequently) dwelt in caves, and commencing the chapter on doors with the remark that "the origin of the true door is not known, nor is the inquiry of great importance." We might refer the author to the sketch of the development of architecture in the Fifth Book of "Sordello"; how the prehistoric man—

> "Dreams, and shapes
> His dream into a door post—just escapes
> The mystery of hinges";

but these considerations are not very practical. Some good illustrations of doors are given—chiefly old Colonial; also some bad ones, such as that on page 85, which the author seems to admire. In fact, bad and good work is very much mixed in the numerous illustrations, and the author seems impartial in regard to them. A few plans are given in the chapter on "Planning the House." The chapter on "Plumbing" shows us a complete section of the piping of a house, with, among other things, the bath waste going direct into the soil-pipe just below the trap of the adjoining water-closet; but we can hardly believe that this is a feature of American plumbing, although it seems that even in their best houses the objectionable arrangement of bath and water-closet in the same room is in general use.

The book contains a large number of illustrations of American houses and American architectural features and ideas, which give it some interest; and it is pleasantly written and attractive; but we do not think much more can be said for it.

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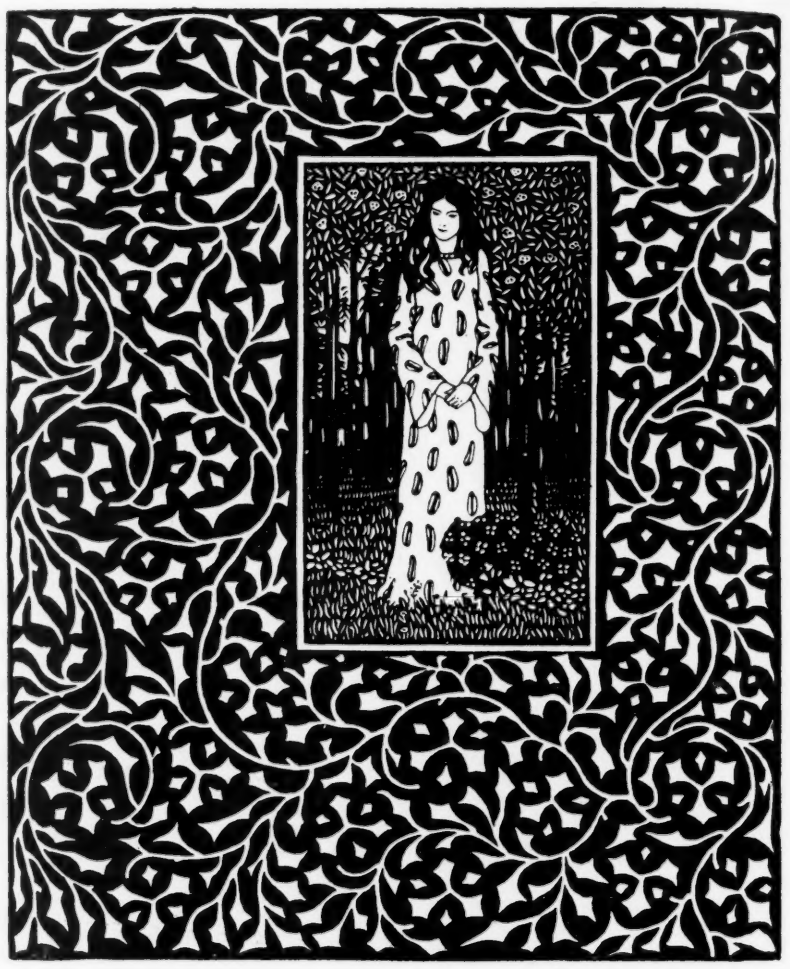
*Practical Sanitation.* By GEORGE REID, M.D., D.P.H. With an Appendix on Sanitary Law, by HERBERT MANLEY, M.A., M.B., D.Ph. Thirteenth Edition. (London: Charles Griffin & Co. 1906.)

DR. REID'S well-known book has already been reviewed in these columns, and the new edition does not call for extended notice. The appendix on sanitary law occupies about one-fifth of the volume, and has been entirely re-written by Mr. Manley. The other part of the book has been revised, particularly the chapter dealing with sewage disposal. The book is intended for sanitary inspectors and others interested in sanitation, and one does not expect to find in it very much information about details of house construction. The chapter on this subject is very good as far as it goes, but surely if ample means are provided for the ventilation of a cavity in a hollow wall the wall will cease to be a bad conductor of heat. On page 183 "wood-brick floor" is said to be the name in common use for what is generally known as a wood-block floor. The book can be heartily recommended to students of sanitation.



*Page from an Amanack (wood-engraving). From "Jung Wien."*

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*Jung Wien: Ergebnisse aus der Wiener Kunstgewerbe Schule.* (Darmstadt; Alexander Koch.)

IN other words: "Young Vienna: the results of the Viennese Art-work Schools." It is a quarto volume containing reproductions of designs in architecture, furniture, and decoration, made by pupils in the various schools. The name of the artist in each case is given in the margin, and the name of the atelier at the foot of the page. The designs include also some sculpture, and a good many designs for decorative pages of books, decorative alphabets, etc.

The designs are full of talent, and in a style very different from what we are accustomed to see in the work of English art-students. Some of them no doubt are odd and more curious than beautiful; but taking them as a whole, there is much to admire in the collection. We give a reduction of one of the book-page designs; it is by Herr Karl Krenek, a pupil in the atelier Czeschka, and is an impression of a block of wood-engraving.

We have, from the same publisher, a bound volume of *Deutsche Kunst und Dekoration*, an illustrated art-periodical which has been before referred to in our columns, and which contains a remarkable medley of well-executed illustrations of German decorative work of all kinds—architecture, furnished interiors, utensils, book decorations, lace, etc.; some of them grotesque enough in character, but many of them of remarkable ability.

*Innen-Dekoration* (same publisher) is a bound volume of the art-magazine under that title, the illustrations of which, as the name implies, are chiefly views of interiors showing furniture and decoration.

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VISIT OF THE SURVEYORS' INSTITUTION TO GLASGOW.—The members of the Surveyors' Institution are visiting Glasgow this week, and they were officially received on behalf of the Corporation at the opening meeting, which was held in the Windsor Hotel on Thursday.

# Illustrations.

## HALL, PORCH, AND INTERIORS IN HOUSE, KENSINGTON PALACE-GARDENS.

IN our issue of December 15 of last year we published the exterior elevation of this house. We give in the present issue perspective drawings of the hall, the porch, and two views in the interior.

The hall is panelled in oak; the stone chimney-piece is in Painswick stone; the carving is by Mr. Aumonier.

The porch, as well as the rest of the house, is in red brick and Portland stone.

This is one of the houses in this road built by Mr. William Willett.

The architect is Mr. E. J. May. The drawings of the hall and the porch are exhibited at the Royal Academy.

## SCULPTURE AT THE PARIS SALON.

THE examples of sculpture at the Salon are all referred to in the article on that subject on another page, with the exception of M. Boisseau's "La Jeunesse," which belongs to last year's Salon.

As will be gathered from the article on the subject, there are other works at the Salon which we should have been glad to illustrate; but these photographs were immediately obtainable; the others were not. We may be able to give illustrations of one or two other works later on.

## PRINCIPAL ENTRANCE, BIRMINGHAM UNIVERSITY.

THE following description of this illustration, which was published in our last issue, arrived too late for publication along with the plate :—

The illustration shows the principal entrance to the Birmingham University, founded by Mr. Chamberlain, and now in course of erection.

The entrance is in the centre of a semi-circular court, and leads into a large domed vestibule the whole height of the building, and thence immediately opposite into the great hall; on either side are the entrances to the corridors that connect the various blocks, of which those for engineering, electrical engineering, mining, and metallurgy have been already erected.

The materials employed for the exterior are Darley Dale stone and thin Accrington facing bricks, the domes being covered with lead.

The series of sculptured figures over the entrance are by Mr. Henry Pegram, A.R.A., and represent Virgil, Plato, Michelangelo, Beethoven, Shakespeare, Newton, Watt, Faraday, and Darwin.

The heraldic sculpture over the window is by Mr. W. S. Frith.

The ceramic frieze representing Learning is designed by Mr. Anning Bell, and executed by Messrs. Minton, Hollins, & Co.

The contractor is Mr. Thomas Rowbotham, of Birmingham, Mr. Henry Gray being the clerk of works, and Sir Aston Webb, R.A., and Mr. E. Ingress Bell the joint architects.

## COURT OF COMMON COUNCIL.

A MEETING of the Court of Common Council was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

*Paving Works.*—The Streets Committee submitted for acceptance a tender of the Val de Travers Asphalte Paving Company, Ltd., to maintain the carriage-ways of Crown-court, Old Broad-street, at 4d. per yard super. per annum; Bread-street (Cheapside to Watling-street), at 10d. per yard super. per annum; Nicholas-lane (Cannon-street to King William-street), at 10d. per yard super. per annum; London Wall (Moorgate-street to Wood-street), at 1s. per yard super. per annum; Carter-lane (South district) at 1s. per yard super. per annum; Carter-lane (West district), at 1s. per yard super. per annum; Alderman's-walk, at 4d. per yard super. per annum; New Broad-street, at 4d. per yard super. per annum, for a period of five years. The Court agreed.

*Cleansing of Statues.*—The Streets Committee reported that they had given instructions for cleansing and renovating the King William and the Prince Consort statues at a cost of about 48*l.*

Mr. Deputy Millar Wilkinson inquired if any steps had been taken with regard to other statues in the City.—Mr. Stopher, the Chairman of the Committee, in reply, said that they would be cleaned under the direction of the Engineer's Department.

*Embankment at Hornchurch.*—The Streets Committee reporting on the necessity for constructing an embankment at Hornchurch to comply with the requirements of the Thames Conservancy, and to facilitate the deposit of refuse on the land at the rear of the Wharf, stated that the work is being carried out by Messrs. Wm. Cory & Sons, Ltd., and recommended payment of their accounts, amounting to 203*l.* 8s. 10d. for the work already completed.—This was agreed to.

*Royal Sanitary Institute Conference.*—On the recommendation of the Port of London Sanitary Committee, it was agreed that the Chairman and late Chairman of the Committee, with the Medical Officer of Health of the Port, be appointed delegates to attend this conference to be held in Dublin in June next.

*Improvements and Repairs.*—The City Lands were authorised to accept the tender of Messrs. Lidstone & Son, 540*l.*, for external painting at Corporation-buildings, Farringdon-road, and to expend a sum not exceeding 100*l.* in repairing and renovating plans in Surveyor's Department, and in fitting up the plan-room for the proper storage of such plans. The Committee also reported that a sum of 108*l.* 9s. 10d. has been expended in alterations and fittings in the room of the Director of the Art Gallery, at Guildhall.

## WESTMINSTER CITY COUNCIL.

AT the fortnightly sitting of the Westminster City Council on Thursday last week the following matters were dealt with :—

*Loans.*—It was agreed to apply to the London County Council for sanction to borrow 40,000*l.* for the purposes of defraying part of the cost of the acquisition by the City Council of the freehold of the Grosvenor Canal and the other adjoining property for the provision of wharves, plant and equipment for the collection and disposal of house and street refuse.

*Stoneware Goods.*—On the motion of the Works Committee it was agreed to accept the offer of Messrs. G. Knowles & Co. for the supply of 4-in., 6-in., and 9-in. drainpipes, of which about 600 are likely to be required during the year.

*Paving.*—Mr. P. Smith having withdrawn his tender for repaving with wood blocks Adam's-mews, Craven-street, and part of Park-lane, it was agreed to accept the tender of the Improved Wood Pavement Company, Ltd.

*Underground Bakehouse.*—A letter was received from Messrs. Ernst Runtz & Ford, architects and surveyors, applying, on behalf of Messrs. E. Rumpelmayer & Co., for the Council's permission to the continued use of part of the basement of the premises No. 10, St. James'-street for trade purposes. The underground bakehouse is not at present used as a bakehouse. It was agreed that, subject to the Council's regulations as to bakehouses being complied with to the satisfaction of the Medical Officer, a certificate relating to its sanitary conditions be granted.

## BOOKS RECEIVED.

THE COUNTRY GENTLEMEN'S ESTATE BOOK: 1907. Edited and compiled by W. Broomhall. (The Country Gentlemen's Association.)

THE MODERN PLUMBER AND SANITARY ENGINEER. Edited by G. L. Sutcliffe, A.R.I.B.A., M.R.S.I. Divisional Volume II. (The Gresham Publishing Company.)

# Trade Catalogues.

MESSRS. D. G. SOMERVILLE & Co. send us the 1907 edition of their handbook of standard steel and reinforced-concrete construction. It is a significant fact that this firm now give the first place in their catalogue to concrete-steel instead of to constructional steelwork, and announce that they are prepared to submit designs and tenders in accordance with six well-known systems of applying the former material. The first thirteen pages deal with the general advantages and the design of concrete-steel construction. While most of the matter in this part of the handbook is correct, several paragraphs on the design of concrete-steel beams need careful revision by an expert, as we notice one or two serious inaccuracies which certainly ought to be put right. In the next section of the handbook particulars are given of Somerville's special systems of fire-resisting floors, some of concrete-steel and others embodying concrete and rolled-steel joists. The remaining pages are occupied chiefly by a series of tables giving the properties and loads for rolled-steel joists, compound girders, and stanchions, some useful memoranda on steel roofing, diagrams of steel-roof principals, and photographic views of constructional steelwork executed by the firm.

Messrs. Young & Marten have sent us a large catalogue of over 500 pages, entitled "The Builder's Manual." It is a most comprehensive book, divided into sections, dealing with drain-pipes, tiles, and slates; cement, lime, etc.; timber, doors, balusters, and other woodwork; casements and glass; plumbers' brasswork, tools, cisterns, etc.; baths and other sanitary fittings, pumps, soil-pipes, drain-pipes and fittings, and rain-water pipes; stable and cow-house fittings, etc.; heating apparatus, ranges, kitcheners, mantelpieces, etc.; colours, varnishes, and painters' tools, etc.; gas-fittings, gas-stoves, etc.; garden-hose and fittings; electric bells and telephones, and electric lighting fittings; paperhangings, and other goods used by the builder. It is impossible to draw attention to all the fittings illustrated, but we may say that, while many of them are of the ordinary kind, others possess special features. Particular attention may be draw to the patent range boilers on page 230, A and B; the boilers consist of cast-iron cheeks, into which wrought-iron cross tubes are fitted. The boilers are made of either the block or the boot shape, and in some of them the cheeks are carried down below the level of the fire-bars, so that sediment can collect in the bottom, away from the direct action of the fire. Hand-holes are provided at the ends of the sediment pockets. As the flames pass between the cross-tubes, rapid heating is obtained. The catalogue is one which builders will find extremely useful as a work of reference.

Messrs. Jones & Campbell (Larbert, Scotland) have sent us their catalogue of cast-iron lavatory-stands and other ironwork in connexion with sanitary fittings. Some of the brackets and pedestals have the merit of simplicity, but by far the greater number are ornamented in a way which cannot be regarded as artistic or as suitable for the purpose.

Messrs. Samuel Wright & Co., in a small catalogue, describe and illustrate their "Crown" patent fire-proof partitions, which are made from plaster of Paris and long cocoanut fibre, the edges of the blocks being grooved and grouted with plaster.

Messrs. Parnall & Sons (Bristol) have sent us their catalogue, entitled "Builders' Iron Work." It contains examples of fire-grates of various kinds, one of which is fitted with an adjustable fall-down front bar. Among the other illustrations are kitchen ranges, iron gates and railing, sign brackets, floor gratings, and weighbridges.

From Messrs. Thomas Crapper & Co. we have received a leaflet containing illustrations and prices of their well-known "Kenon" intercepting traps, manhole covers, and valve and other closets.

Messrs. W. G. Smith & Co. (Bury St. Edmunds) have issued an illustrated leaflet describing their system of patent glazing. The glazing bar is a steel tee, the table of the tee being fixed uppermost. The glass is bedded on felt laid on the table of the tee, and is secured by means of a flat capping-piece, which is also bedded on felt. The table of the tee is tapped at intervals to receive screws which pass through the capping-piece, the projecting ends being covered with nuts, which keep the cap and glass in position.

Messrs. R. Waygood & Co. have sent us their new catalogue of hand-power lifts and hoisting machinery. Examples are given of lifts for furniture, motor-cars, carriages, hospital patients and invalids or other passengers, parcels, food, coals, beer-barrels, etc. Illustrations are also given of lift-enclosures and of their improved safety apparatus. We have also received from the same firm a small catalogue showing their electric passenger lifts, hoists, cranes, etc., and their hydraulic motor-car lift, and a leaflet showing their electric friction hoists.

FEVER HOSPITAL, MUSSELBURGH.—On the 17th inst. the new infectious diseases hospital, which has been erected for the burgh of Musselburgh at Esk Grove, was opened. The plans were prepared by the Burgh Surveyor, Mr. George Landale, and the buildings have cost 6,200*l.*, the site 1,500*l.*, and the furnishings over 400*l.*

# Correspondence.

## BATH STONE QUARRIES.

SIR,—My attention has been called to a paragraph, for which I am personally responsible, in the fifth volume of "Modern Buildings," to the effect that all the Bath stone quarries "are owned by the same great combine." This, it appears, is not correct, as there are three large quarries producing stone of the best quality in other ownership, namely:—Messrs. Marsh, Son, & Gibbs, Ltd., of Hartham Park Quarries; Messrs. Yockney & Co., of the well-known Corsham Down Quarries; Messrs. The Corsham Quarrying Company, Ridge Quarry, adjoining Monks Park Estate, and several smaller firms.

I should be exceedingly sorry if any statement of mine, however inadvertently inaccurate, were harmful to the interests of others, as it seems this is likely to be, and should be obliged if you will kindly allow this letter of explanation to appear in correction thereof. G. A. T. MIDDLETON.

## CALEY-STREET SCHOOLS.

SIR,—We observe that in your last issue of the *Builder* the list of tenders is published in connexion with Caley-street Schools, Limehouse, for the London County Council, in which list our name appears at the bottom, revealing a great difference between our price and that of the builders above us whose tender has been accepted, but without any explanation for this being given, and we think it only right and just to ourselves to ask you to publish the fact that our estimate was withdrawn, *before the tenders were opened*, owing to our having discovered a very serious discrepancy in the cast of our summary.

J. CHESSUM & SONS.

# The Student's Column.

## ELECTRIC LIGHTING AND HEATING.—XX.

*The Electric Arc—The Carbon Arc—The Arc Lamp—Enclosed Arcs—Flame Arcs—Magnetic Arcs—Mercury Vapour Lamp.*

THE ELECTRIC ARC.—Sir Humphry Davy found in 1800 that when two pieces of wood-charcoal (the electrodes) were connected with the terminals of a powerful battery and separated, an electric flame was kept up between them, and a dazzling light was emitted by the white-hot ends of the pieces of charcoal. This flame is called the electric arc, and it can easily be maintained between practically all conductors. That the arc may burn steadily, however, a certain minimum voltage is required. For instance, when the electrodes are of copper the arc will not be maintained unless the pressure be at least 23 volts. There are many drawbacks to the use of an arc between copper electrodes. It gives little light, and the light is of a greenish hue. The copper electrodes melt away rapidly, and, copper being a good thermal conductor, the heat is not localised at the ends of the arc. Fumes are also given off. It will thus be seen that it is much inferior to carbon. In conjunction, however, with magnetite it forms a brilliantly luminous arc, and an arc-lamp having an alloy of magnetite for one electrode and copper for the other has been successfully constructed by Professor Steinmetz and the General Electric Company in America.

*The Carbon Arc.*—The phenomena in connexion with the carbon arc have been investigated very carefully by Mrs. Ayrton. The results obtained are published in the *Journal* of the Institution of Electrical Engineers, Vol. 28, p. 400. The curves shown in Fig. 52 are taken from this paper. They represent the "statical characteristics" of the arc for distances apart of the electrodes of 7 and 3 mms. respectively. The arc was burning in the open air, the positive and negative electrodes were of solid carbon 1·1 cm. and 0·9 cm. in diameter respectively. The ordinates (vertical lines) represent the voltages between the carbons and the abscissæ (horizontal lines) represent the current in amperes through the arc. For instance, in the upper curve, the 7 mms. characteristic, the carbons were kept at a fixed distance of 7 mms. apart, and the resistance in series with them was diminished so as gradually to increase the current passing through the arc. When the current was only 2·5 amperes the voltage was 80. It will be seen that as the current increases up to 8 amperes the voltage between the carbons rapidly falls to 64 volts. As the current increases further the rate at which the voltage diminishes gets smaller. At 21 amperes the voltage is 58. At this current the arc makes a humming noise, and when examined by a suitable stroboscopic sectored disk it is found to be in rapid rotation, sometimes making as many as 400 revolutions per second. If the resistance in series with the arc be diminished slightly the current will rise suddenly to 23 amperes and the pressure between the electrodes falls 10 volts. The arc will now make a hissing noise. Increasing the current still further makes no appreciable change in the voltage, and so the characteristic curve for a hissing arc is practically a straight line. If a similar experiment be made with the carbons 3 mms. apart we get an exactly similar set of phenomena. It will be seen (Fig. 52) that the 3 mms. and 7 mms. characteristic curves are very similar.

It is interesting to notice that the apparent resistance of the electric arc diminishes as the current increases, the ratio of the voltage to the current getting smaller and smaller. The part of the curve shown by the dotted line represents the unstable state. The break in the continuity of the curve shows that some physical change takes place when the arc starts hissing.

In Fig. 53 is shown a tracing of the images of the two ends of the carbon when the arc has been burning some time, the source of supply being the direct current mains. It will be noticed that the positive carbon is hollowed out, a crater being formed. Globules of carbon are also shown adhering to the negative carbon. When the carbons are of equal size the positive burns away twice as rapidly as the negative, and is obviously at a much higher temperature, as more than 80 per cent. of the total light comes from the incandescent end of the positive carbon. In ordinary direct current arc-lamps the carbons are placed in the same vertical line, and thus the lower carbon (the negative one) cuts off a considerable proportion of the light emitted from the positive carbon. For this reason the lower carbon is generally made of smaller diameter than the upper one. If the ratio of the diameters be about 1·5 the carbons will consume away at approximately the same rate.

*Fig.* 52.

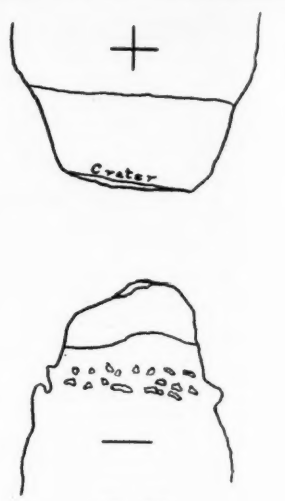


*Fig.* 53.

*The Arc Lamp.*—When an arc lamp is run from the ordinary direct current supply mains it is necessary to put a resistance in series with it. The method of connecting the lamp L and the resistance S is indicated in Fig. 54. As the open arc only requires about 45 volts, more than half the energy supplied would be expended in heating the ballasting resistance S. It is customary, therefore, on 110 volt circuits to use two open arcs in series, as we get twice the amount of light for the same consumption of energy. If the voltage of the supply be 220, then four arc lamps can be run in series, but in all cases a certain amount of ballasting resistance has to be in circuit.

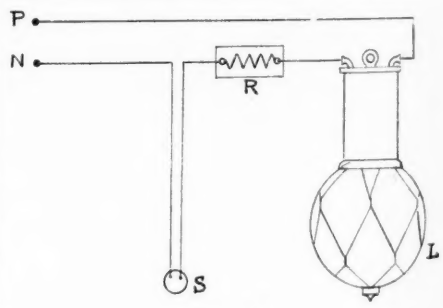


*Fig.* 54.

The following experimental results illustrate the efficiency of lighting by means of four arc lamps in series. "Apostle" carbons were used in each of the lamps, the diameter of the positive being 1·8 cms. and of the negative 1·2 cms. The supply voltage was 220, and the current taken by the four lamps was practically constant and equal to 10 amperes throughout the test. The potential difference across the carbons varied between 42 and 44. The maximum candle-power of each lamp was approximately 2,000. Both carbons consumed away at the rate of half-an-inch per hour, and they burned perfectly steadily with no flickering. The weight of the ash formed per lamp per hour was only about the quarter of a gramme.

In wiring for arc lamps it is advisable that each separate circuit should have a double-pole switch and a double-pole fuse.

As the ballasting-resistance gets very hot, it should be enclosed in a fireproof case and mounted on insulators. It should also have a fireproof backing. It is necessary that the upper carbon should be the positive one, and hence the polarity of the mains has to be determined. This may readily be done by allowing the lamp to burn for a minute and then switching it off. The positive terminal is always much the brighter, and it can thus be detected at once. If it happen to be the lower one, then it is easy to reverse the connexion with the supply mains.

*Enclosed Arcs.*—In the enclosed arc lamp the arc is burned in a glass globe from which the air is practically excluded. When the switch is first turned on the small amount of oxygen present in the globe combines with the carbon to form carbon monoxide, and as the carbons fit tightly through the openings into the globe any further access of oxygen is prevented. The gases surrounding the arc are thus inert, and the carbon ends merely volatilise, the combustion being negligible. The consumption of the carbons is thus much slower and a much longer arc can be obtained. In the ordinary open arc lamps the carbons usually last from 10 to 20 hours, but in the enclosed arc lamps the carbons last from 100 to 200 hours. They require, therefore, much less attention. In the low-voltage type of enclosed arc lamp the P.D. between the carbons is 80 volts, and with a ballasting resistance requiring about 25 volts it can run satisfactorily on a 105 or 110-volt circuit.

After running for about 100 hours it will be found that the upper part of the globe gets coated with a white deposit, and this absorbs an appreciable quantity of light. It may even lead to the glass melting, as it prevents the heat from escaping. It may be readily removed, however, by means of a dry duster, and this ought always to be done when the lamp is re-carboned.

The great advantage of enclosed arcs lies in the quality of the light they emit. This light approximates very closely to sunlight, and is superior in this respect to any other kind of artificial illuminant. For this reason enclosed arc lamps are of use in drapers' shops, etc., as they often enable the colours of ribbons, etc., to be matched when this is quite out of the question with gas or incandescent lighting. A drawback to their use is that their efficiency is not high, being about half a candle per watt, or only about double that of the ordinary carbon filament glow lamp.

*Flame Arcs.*—In this type of arc special carbons are used, which are impregnated with salts of calcium. Long thin carbons are employed, and instead of being placed in the same vertical line they are arranged side by side at a small inclination to one another. The ends feed into an inverted porcelain cup, in which the arc is formed. A strong magnetic field is used to blow out the arc into a fan-shaped flame.

As the carbons have to be very thin they burn out quickly, and as they are more costly than ordinary carbons maintenance charges are higher. Magazine lamps are coming into use in which the burnt-out carbons are automatically replaced by new ones. The colour of the light emitted by this lamp can be varied throughout a wide range by impregnating the carbons with different metallic salts. "Ruddy yellow" or "sun ray" carbons are those usually preferred, but the light, although not unpleasant to the eye, is really very unlike sunlight.

For indoor use flame arcs are quite unsuitable owing to their excessive brilliancy and the objectionable fumes which are generally produced. Unlike the open carbon arc, most of the light emitted comes from the arc itself. The calcium vapour which enters the arc becomes brilliantly luminous, and if the light be examined by a spectroscope, groups of bright lines, particularly in the yellow portion of the spectrum, will be observed, which show that a large fraction of the light comes from a luminous gas. The calcium vapour is fed into the arc by the positive terminal, which is much the hotter, and the efficiency depends entirely on the temperature of the positive.

*Magnetite Arcs.*—In the magnetite arc lamp, which has been perfected by Professor Steinmetz in America, the positive electrode consists of iron magnetite with an alloy of titanium, and the negative electrode is of copper. This lamp is analogous to the ordinary carbon flame arc. The magnetite acts like the carbon in starting the arc and the titanium like the calcium salts in making it luminous. The life of the magnetite electrode, however, is about twenty times as long as that of the carbon electrode, and the copper electrode practically never needs to be replaced.

*Mercury Vapour Lamp.*—This lamp, which has been perfected in this country by Mr. Bastian, consists practically of a vacuous glass tube containing mercury vapour. It becomes luminous under electric stress in the same way that a vacuum tube does, and its efficiency is very high, although the colour of the light is objectionable.

From the scientific point of view the flame arc, the magnetite arc, and the mercury vapour lamp are the most interesting of the electric lamps. They seem to be the forerunners of the electric lamps of the future, which will convert electricity into light directly without the necessity of transforming it first into heat. As their efficiency is about four candles per watt, it is about sixteen times greater than that of the ordinary carbon filament lamp.

## General Building News.

HEREFORD CATHEDRAL.—The restoration of the west front of Hereford Cathedral is now nearing completion, and on the 14th inst. the corner stone of the south-west turret was laid with Masonic ritual by the Earl of Warwick. The renewal of the west front of the cathedral has been in progress since 1901, and all that now remains to be completed is the west front of the south aisle. The west front of the north aisle, with the addition of a massive turret and carved medallion, was finished seventeen months ago. The western front of the south aisle is in course of erection, and the Freemasons of the Provincial Grand Lodge of Herefordshire have undertaken to provide for the construction of the south-west turret, by which it will be flanked. The architect is Mr. J. Oldrid Scott.

CHURCH OF SS. PHILIP AND JACOB, BRISTOL.—The Chapel known as "the Kemys Chantry," which has remained disused since its suppression, *temp.* Edward VI., has just been re-opened for services, and the monument which obstructed the east end of the chapel is removed to the west end of the church. The church, founded in the XIIth century, is a spacious structure after the Early English style with a lofty embattled tower; it was enlarged for about 650 additional seats some sixty years ago.

NEW CHURCH, CATHCART, N.B.—The New Cathcart United Free Church was opened on the 9th inst. The church, which provides accommodation for 780 persons, was built from plans prepared by Mr. J. B. Wilson, architect, Glasgow, and the cost is estimated at 5,500*l.*

NEW CHURCH, TWERTON.—The nave of the new Church of the Ascension in Claude-avenue, South Twerton, has now been completed. The building is entirely faced with local freestone within and without. The east end is at present bricked up. The accommodation is for some 440 persons. Mr. Buckle, the Diocesan Architect, prepared the designs.

CHURCH EXTENSION, RADLETT.—A new nave has been erected at the Radlett Parish Church. The work of constructing the nave, which is on the south side of the original building, has been in progress since July, and is in harmony with the old building. The facing is entirely of flint, with Corsham Down Bathstone dressings. The roof is constructed of pitchpine, left clean and unstained. The heating apparatus has been enlarged and improved. The extensions are being carried out by Messrs. J. O. Scott & Sons, architects, of Westminster, Mr. A. O. Breeds being the surveyor, and Messrs. Bowman & Sons, of Stamford, the contractors. The contract for the new nave—by which accommodation is added for 240 people—was 2,741*l.*, exclusive of architect's fees, and the tender for the chancel is 2,309*l.* 11s. 8d.

PROPOSED RESTORATION OF BLOFIELD CHURCH, NORFOLK.—A report has been submitted by Mr. W. D. Caröe, F.S.A., to the Blofield Church Restoration Committee respecting the condition of the church, and suggesting various methods of restoring those parts which required immediate attention. The report states that the two end walls of the aisles have no foundation at all. So far as their constitution is concerned they are virtually rotten, as the mortar is so granulated that it has no cohesion. The south arcade has gone over very considerably, and most unfortunately a miserable modern roof has been put across the nave, which is so weak and so wretchedly constructed that it is helping to further thrust out the walls. Mr. Caröe suggests that the chancel arch and eastern walls of the aisles should be taken down and rebuilt afresh, setting the piers upright, and putting the walls, etc., on a solid foundation. The report also gave an alternative and cheaper scheme, but after considering the matter the committee decided unanimously in favour of the first scheme.

PARISH HALL, ST. ANDREW'S, EARLSFIELD.—The foundation-stone of this hall was laid by Princess Christian on Saturday last. The building will face Waynflete-street, Garratt-lane, and adjoins the vicarage grounds. The hall, which will be 80 ft. by 38 ft., will seat about 500 persons. Two classrooms are provided at the platform level, and over these is a room (with separate side-entrance) to accommodate about 150 persons. A kitchen, cloakrooms, and stores are provided in half basement under classrooms. The buildings are to cost a little over 3,000*l.* The architect is Mr. Frederick E. Halford, London, and the contractors are Messrs. W. Johnson & Co., Ltd., Wandsworth Common.

CHURCH ENLARGEMENT, CAMBERLEY.—The newly-erected part of St. Paul's Church, Crawley Ridge, consisting of a portion of the nave, the choir, sanctuary, organ-chamber, and clergy and choir vestries, was recently dedicated by the Bishop of Winchester. St. Paul's new church was commenced in 1902, when the body of the church and part of the nave were erected. This cost 2,200*l.*, and provided accommodation for 300 people. The new portions, which were commenced early this year, provide 200 more seats. The cost of the enlargement was 3,600*l.*, making a total expenditure so far of 5,800*l.* The builders were Messrs. Collins & Godfrey, of Tewkesbury, and the architect Mr. W. D. Caröe, of Westminster. The exterior of the building has been mainly constructed of red brick and oak, while for the interior pitch-pine has been used. The church is lighted by inverted incandescent lights, and heated by hot water throughout.

CHAPEL RENOVATION, BRIGHTON.—The chapel at the Sussex County Hospital was recently re-opened. It has been closed for six months, and during that time it has been completely renovated. The windows and the glass work generally have all been renewed, new tiles have been laid, a new pulpit erected, and a new organ-chamber fitted up. Some new stone work has also been introduced, chiefly round the windows. The work has been carried out under the direction of Mr. John Oldrid Scott, architect, who designed the windows, and Mr. Cawthorn, the Hospital Architect.

NEW COUNCIL SCHOOLS, BLACKPOOL.—Two new schools have been erected for the Blackpool Education Committee; one at the corner of Waterloo-road and Hawes Side-lane, South Shore, and the other in Claremont-road, North Shore. The Waterloo School, when completed, provides accommodation for 900 scholars, 540 in the mixed department, and 360 in the infants'. The mixed department only has been erected, and the infants' department will be added when necessary. The building is of the single story type, and consists of a central hall with nine classrooms, to accommodate sixty scholars each, grouped round the three sides of the central hall, and the various offices, consisting of teachers' rooms, cloakrooms, stockrooms, etc., situated at the two corners, while two refreshment-rooms are provided in the roofs at each front corner of the school. The exterior is finished in first quality Accrington bricks, with Nelson stone dressings. The outside buildings consist of boys' and girls' shelters, with lavatory accommodation to each. The drainage system includes three automatic siphon sewer flushes. The heating installation is on the low-pressure hot water system, with the necessary pipes and radiators. The ventilating system consists of roof extractors of the vertical turret type, and fresh-air inlets in the outside walls. The fresh air is brought to the central hall through 18 in. earthenware pipes laid under the floor, and is admitted through aluminium grates in the screens. The lighting is on the inverted incandescent gas system, with pendants and wall brackets. The whole of the interior woodwork is stained orange and varnished, and the floors are paved with red deal tongued and grooved wood blocks, laid on a new system. The classrooms are provided with galleries, chart-rails, map-rails, and blackboards running the whole width of the rooms. The principal contract has been carried out by Mr. James Eaves, builder, of Blackpool, and the sub-contractors were the following:—Mr. T. H. Smith, joiner's work; Messrs. Gaskell & Tilley, mason's work; Mr. Robinson, slater's work; Messrs. W. Walker & Co., Ltd., plasterer's work; Mr. S. Walsh, plumber's work; Messrs. Hallmark & Gill, gas fittings; Messrs. Morrison & Roebuck, electric bells and lightning conductors; Mr. James Gibbons, ironmongery; Messrs. Musgrave & Co., sanitary fittings; Messrs. Ward & Co., asphalting; Messrs. C. Seward & Co., heating installation; and Messrs. Saunders & Taylor, ventilating installation. The clerk of works was Mr. Thomas Warhurst. The cost of this school has been 7,891*l.* The Claremont School, when completed, will provide accommodation for 900

scholars, 540 in the mixed department and 360 in the infants'; but as in the case of the Waterloo School, the mixed department only has been erected, and the infants' will be added when found necessary. The school dimensions and accommodation are similar to those of the Waterloo School. The principal contract has been carried out by Messrs. Dryland & Preston, of Blackpool, and the sub-contractors were the same as the others, with the exception that Messrs. Butterworth & Son did the joiner's work and mason's work, and Mr. Seel, the slater's work. The cost of this school has, so far, amounted to about 7,200*l*. The whole of the plans, estimates, quantities, etc., for both buildings have been prepared, and the work supervised, by the Borough Surveyor, Mr. J. S. Brodie, M.Inst.C.E., assisted by Mr. Fred. G. Wolstenholme, A.M.Inst.C.E.

NEW COUNCIL SCHOOLS IN GLAMORGAN.—New Council schools have been erected at the Heath and Hawthorn respectively in the Whitchurch district. The accommodation provided in each of the mixed schools is for 250 children, and the infants' schools have each accommodation for 150 children. The new infants' schools are built of local stone, with Ruabon brick and Bath stone dressings. The roofs are covered with Welsh slates. The schools were designed and carried out under the supervision of the County Architect, Mr. D. Pugh Jones, Cardiff. The contractor for the Heath Schools was Mr. W. T. Morgan, Cardiff, and the cost 4,600*l*.; the contractor for the Hawthorn Schools being Mr. Stephen Shail, Llandaff, and the cost 4,175*l*.

COUNCIL SCHOOL, LEIGH.—The foundation-stone was laid a short time ago of a new Council school, which is being erected on a site in Windermere-road, Leigh. Mr. J. C. Prestwich, of Leigh, is the architect, and Messrs. R. Neill & Sons, Manchester, are the builders. The estimated cost of the building and furnishing is about 11,000*l*. It will accommodate 940 children—300 infants, 320 boys, and 320 girls.

WORKMEN'S INSTITUTES, BARGOED.—The workmen of Bargoed and Aberbargoed have decided to provide two buildings for libraries and institutes. The first has already been commenced at Aberbargoed, Mr. Bond, of Cardiff, securing the contract at 2,500*l*. The second building will be identical in design, and is to be erected on the Bargoed side of the valley. Messrs. James & Morgan, Cardiff, are the architects.

PROPOSED NEW COUNCIL OFFICES, ACTON.—The Acton District Council, having decided that plans for the new Council offices shall not exceed 18,000*l*., met recently to formulate a scheme on that basis. Consideration was first given to a report showing the present office accommodation of the various departments, and subsequently the schedule of accommodation provided for in the revised 35,000*l*. scheme proposed by the late Council. This latter was curtailed in regard to the number of rooms to be provided, after which instructions were given to the surveyor to prepare a sketch drawing and estimate of the cost in accordance with the Council's requirements. It was decided that a letter should be addressed to Mr. W. G. Hunt, architect for the 35,000*l*. scheme, informing him of the Council's abandonment of that proposal and of the steps now being taken.

VOLUNTEER HEADQUARTERS, BIRKENHEAD.—The new headquarters of the 1st Cheshire Royal Engineers Volunteers, Harrowby-road, Birkenhead, were recently opened. The buildings comprise—drill hall, 110 ft. long, 60 ft. wide, with engineering stores; bandroom, quartermaster's stores and office. To the front of the building, on the ground floor, there are—commanding officer's room, adjutant's room, orderly room, armoury and ammunition stores, and men's recreation room, 48 ft. by 22 ft. On the first floor there are officers' accommodation, sergeants' mess-room, caretaker's kitchen and scullery. In addition a balcony extends the entire length of the drill hall, as a means of communication to the various rooms on this floor. On the next floor is the caretaker's quarters. The buildings are of plain design and built of brick. The architect was Colonel J. P. Fraser, and the builders Messrs. Hughes & Stirling. The contract amounted to 4,741*l*.

LADIES' SWIMMING BATH, MACCLESFIELD.—The ladies' swimming bath, which the Baths Committee of the Corporation have provided at the Public Baths, Davenport-street, by rehabilitating and improving the smaller plunge bath, has been opened. The bath is 34 ft. long, and has a capacity of 13,000 gallons of water, the water depth being 4 ft. 6 in. at the deep end and 2 ft. 6 in. at the shallow end. Mr. C. W. Stubbs is the Borough Surveyor of Macclesfield.

LONDON TEMPERANCE HOSPITAL, HAMPSTEAD, N.W.—Princess Louise recently visited the Temperance Hospital Hampstead-road, and opened the New Out-Patients' Hall, which has been erected on a site adjoining the hospital, at a cost of 11,000*l*. The new building has waiting-room accommodation for 200 patients, with consulting-rooms, operating theatre, dispensary, etc. It has been erected according to the designs of Mr. Rowland Plumbe.

NEW POST OFFICE, FRASERBURGH.—The plans of the new post office, which is to be erected in Mid-street, Fraserburgh, have been approved and passed by the Streets Committee of the Town Council, and the buildings will be proceeded with as soon as the contracts have been let. The front building will be three stories, and constructed of granite. The plans have been prepared by Messrs. Reid & M'Robbie, architects, Fraserburgh. On the ground floor of the main building will be public office and sorting office; on the first floor the operators' department, postmaster's, messengers', women's, instrument and telephone-rooms; and on the second floor will be the caretaker's apartments. At the rear of the main building a sorting office, rooms for postmen, and battery-room, etc., will be placed. The exterior of the building will be of Pitsligo granite, puncheoned with picked dressings. The cost of the building will be about 3,000*l*.

NEW POST OFFICE, CLECKHEATON.—The postal authorities have decided to build a new post office at Cleckheaton. The building, of which sketch plans have been drawn for the authorities by Messrs. Howorth & Howorth, architects, Cleckheaton, will have a frontage to Albion-street of about 60 ft., and will be two stories high, comprising a public office, postmaster's, clerks', and messengers' rooms, telegraph and telephone rooms, a room for the engineers' department, and a sorting office, etc., in the rear.

SANATORIUM, BARRASFORD, NORTHUMBERLAND.—On the 11th inst. the Newcastle-upon-Tyne and Northumberland Sanatorium for consumptives, which has been erected at Barrasford, was opened. The buildings take the form of a crescent, and are of two stories, with the exception of the central portion which has a third story for the accommodation of the nurses. On one side of the central block there are rooms for thirty males and on the other rooms for twenty females. Each room is 14 ft. long, 12 ft. wide and 10 ft. high, and it opens out on to a small balcony or terrace of its own on the south front. Each wing has its sanitary spur, and baths and lavatories, etc., shut off from the corridors by means of cross ventilation. Behind the main block is the administration quarters, and next there are the kitchen, the dining-room, and the recreation-room. Apart from the sanatorium is a small isolation hospital, and separate also are the laundry, the stables, and the electric lighting plant. Water has been obtained by boring, the water being pumped to an elevated position by means of a windmill. Messrs. Speirs & Co., of Glasgow, erected the structure of the building; and the architects were Messrs. Nicholson & Dotchin. The total cost of erecting and equipping the sanatorium amounts to 22,700*l*.

BUSINESS PREMISES, EDINBURGH.—A new building has just been finished in Princes-street from designs by Mr. John James Burnet, A.R.S.A., architect, Glasgow, as business premises for Messrs. R. W. Forsyth. The building occupies the site of the old Douglas Hotel at the corner of St. Andrew-street. It is in white freestone of modern Renaissance design, while the feature of the front is the use of ornamental mahogany surrounded by a frame of marble. The building is finished with a corner tower rising to a height of 127 ft. and carrying a sculptured group and ball. The building has a frontage of 90 ft. to Princes-street and of 70 ft. to St. Andrew-street, and the height to the wall head is 80 ft., with the tower rising above that. There are seven floors. The work has cost between 30,000*l*. and 40,000*l*.

## Appointment.

BOARD OF TRADE.—Mr. Henry H. Montagu, F.S.I., of Messrs. Montagu & Robinson, has been appointed a Surveyor to the Board of Trade for purposes of the Lands Clauses Consolidation Acts.

## Sanitary and Engineering News.

A STEEL IRRIGATION CANAL.—For the purpose of conveying water from a storage reservoir to a point whence it will be distributed through irrigation channels, a steel canal, about 5,680 ft. long, has recently been built across the desert between Assouan and Kom-Ombo. The lower portion of the conduit is a semi-circular trough with the radius of 10 ft., the upper portion consisting of vertical sides 1 ft. 8 in. high. The steel plates used throughout are ¼ in. thick, stiffened inside the canal by curved ribs formed of 5 in. by 3 in. by ⅜ in. T-bars, spaced about 2 ft. 6 in. apart. Along each edge is riveted a longitudinal 3 in. by 2½ in. by ⅜ in. angle bar, to which transverse bracing of flat and angle bars is secured for the purpose of staying the conduit from side to side. The canal was built up in seventeen sections, each averaging 328 ft. in length, connected by intermediate masonry chambers, each 13 ft. long. The end of each steel section projects about 3 ft. 3 in. into the masonry chamber; and is provided with a flush-riveted outer plate, 40 in. wide, forming a sliding bearing on horizontal rails built into the masonry. Beyond the end of these rails there is an annular groove between the steel conduit and the masonry for the reception of packing material, held in place by curved angle bars bolted together through the packing. The new canal is entirely above normal ground level, having been built upon a foundation of sand filled into a trench, 8 ft. wide by 6 ft. deep, excavated on the site of the work. The semicircular stiffening ribs were first laid out upon timber cradles built on the sand foundation, and the side plates having been assembled, were shored up to hold them in place. Riveting was commenced at the bottom and continued upward on both sides simultaneously, this part of the work having been performed chiefly by hand labour owing to the great difficulty experienced in getting the native workmen to use the pneumatic riveting machines supplied. Transverse excavations were made beneath the work to provide means of access for riveting the cross seams, and on several occasions the wind blew so strongly through these passages as to carry away large quantities of the sand foundation, sometimes causing entire sections of the steel trough to sink several inches in one night. The heat of the sun was very great, as may be judged by the statement that the shade temperature frequently reached 117 degrees Fahr. One consequence of the extreme heat was unequal expansion of the metal on opposite sides of the conduit causing the ends to vary in length by as much as 4 in. on occasion. By carrying on work day and night the canal was completed in five months. It is stated that the riveters objected to night work owing to the presence of scorpions in the sand. Our readers will no doubt sympathise with this view, although they may not be able to understand the predilection exhibited by the workmen for machine oil as a beverage, except on the assumption that 117 degrees in the shade was found by the natives to be so chilly as to justify the demand for warming drink. Two coats of asphalt paint were applied to all the steel work, and the finished conduit was banked up outside with sand. The capacity of the canal is 424 cub. ft. per second at the velocity of 3 ft. per second.

SEWAGE WORKS, SHEFFIELD.—The Sheffield Corporation, at their meeting on the 8th inst., confirmed a recommendation to let to Messrs. Logan & Hemingway, of Sheffield and Nottingham, the contract for the construction of six settling tanks, twenty-four contact beds, feed conduits, and other auxiliary works, forming the first part of the new scheme of dealing with the sewage of Sheffield. The scheme, which has been prepared, and is being carried out by Mr. Charles F. Wike, M.Inst.C.E., City Surveyor, Sheffield, is estimated to cost about 300,000*l*., and the amount of the contract now let is 41,046*l*.

SEWERAGE SCHEME, ORRELL.—On the 9th inst. a Local Government Board inquiry was held at the Bootle Town Hall with respect to the application of the Bootle Corporation for sanction to borrow the sum of 3,818*l*. for carrying out sewerage works in Orrell. The Orrell Brook sewer is the first instalment proposed for the drainage of 293 acres in the lower portion of Orrell and 35 acres in Derby Ward, the total length being 867 yards. The sewer is designed to carry the brook water, in addition to the sewage and surface water of the area, and when completed it will allow the brook, which follows an irregular line, to be filled up. The scheme is expected to cost 1,592*l*. The Alexandra-drive sewer is for the drainage of property in that area, consisting of 12 acres of land and also of 38 acres on the south of Linacre-lane. The estimated cost of the works is 2,226*l*. Both the schemes have been drawn up by the Borough Engineer, Mr. B. J. Wolfenden.

FOOTBRIDGE, LEIGH.—A new footbridge has been erected at Leigh over the railway for the purpose of providing a better means of access from the upper part of the town to the beach. The footbridge is approached on the north from Cliff-parade by an 8 ft. path, and on the south it abuts on the Esplanade. The structure has a clear width of 7 ft., and comprises two main steel girders of the open lattice "N" type, with a span of 77 ft. 1½ in. over the railway between the piers. The piers are built of hard stock bricks and faced with blue Staffordshire engineering bricks, and the whole rests on a foundation of Portland cement concrete bed. The contractors for the bridge have been Messrs. Matthew T. Shaw & Co., engineers, London, with whom have been associated Messrs. Baker & Wiseman and Messrs. Buxton & Jenner, of Southend, as sub-contractors for piers and foundations; the Atlas Stone Company, for the concrete floor; and Mr. Beer, of Leigh, for larch fencing. The work has been carried out under the supervision of the Council's Surveyor, Mr. J.

W. Liversedge, and with the approval of the railway company in accordance with the requirements of their engineers. The amount of the accepted tender was 1,453*l.*, to which has to be added the cost of incidental works, giving a total of 1,650*l.*

SEWER VENTILATION.—Dr. G. Quin Lennane, the Medical Officer of Health for Battersea, in his annual report, which has just been issued, says in reference to sewer ventilation, that during the year, nineteen ventilating shafts were erected, four by the London County Council. Three of the latter were for the purpose of ventilating the London County Council's sewer in Nine Elms-lane, and one the sewer in York-road. The remaining fifteen were erected by the Borough Council to ventilate their sewers. Complaints were numerous during the twelve months of the nuisance arising from sewer ventilators on the surface of the roadway. In consequence upcast shafts were put up as mentioned to remedy the nuisance, and in some cases in addition it was found essential to close down the surface ventilator. The question of sewer ventilation is becoming a perennial one, and owing to the excessively hot and dry summer of 1906 the nuisance from this source was very widespread. The problem of how best to solve the difficulty is becoming serious, and opinions differ as to the means by which this can be best and most economically effected. In dealing with the question of sewer ventilation, it is important to draw the distinction between sewer-gas and sewer-air, which terms are frequently confounded. The former consists of organic and other gases, the outcome of fermentative and decomposing changes in organic matter; the latter is practically atmospheric air which has gained access into the sewers. Sewer-air probably is not particularly harmful, but the same cannot be said for sewer-gas, which possesses deadly properties. In well-laid, well-built, properly-ventilated, and frequently flushed sewers, sewer-gas is rarely given off, but in old, defective, and badly ventilated sewers, many of which still exist in the metropolis, the converse is the case. The danger to health from emanations from sewers in which this gas is generated in excess is considerable, and it is well known that headache, nausea, vomiting, diarrhœa, lowering of vitality (predisposing to infectious and other diseases) are due to this cause. Thorough and efficient ventilation is, therefore, the essential and obvious remedy, and as to how this can be most effectively carried out is the problem to be solved. It is generally agreed that the provision of properly constructed shafts of sufficient calibre, in addition to the surface grids, is the most efficient method of dealing with the nuisance. Practically all sanitarians are agreed that sewers require to be thoroughly ventilated, the opinions only differing as to how this can best be effected. The argument in favour of closing down surface grids is, in the opinion of the Medical Officer of Health, not a sound one, and this should not be resorted to unless under exceptional circumstances. Rather should these openings be increased in number, especially in wide thoroughfares. The more air that enters a sewer the better, as in this way sewer-gas is diluted and oxidised, and consequently rendered innocuous. In narrow streets and courts it may occasionally be necessary to close down these openings, but only in such cases is it desirable. Upcast shafts may be an excellent auxiliary to surface grids, but it is difficult to see how they can become an effective substitute for the latter. Another important point to remember in connexion with effectively ventilated sewers is the diminished risk of sewer-gas gaining access to the house drains by forcing the seals of the intercepting traps.

MEDICAL OFFICER'S REPORT ON THE HEALTH OF LONDON.—In the Report for 1906 of the Medical Officer of Health for the City of London, the following points may be noted:—In regard to cremation, it is stated that the growing feeling in favour of cremation as a means of disposing of the dead is shown by the increase that has taken place in the number of bodies so dealt with at the City of London Cemetery, Little Ilford. Whereas only nine cremations took place there in 1905, the number had increased to 23 during 1906. It will be seen from the table published in the Report that a similar increase occurred at nearly all the other crematoria mentioned therein. The number of crematoria established are steadily increasing, six having been opened during the last four years, and others are contemplated. Twelve are now in operation in England and one in Scotland.——Complaints having been received of the sanitary arrangements at the Royal Exchange, a systematic inspection was made of the building and the drains tested. Defects were found in nearly all the shops, and it was ascertained that the brick drain which runs round the Exchange was in an unsound condition. As there is considerable difficulty in putting in a separate drain for each shop, and as the ventilating pipes would disfigure the building, a combined system has been proposed by the Surveyor to the Gresham Committee, which appears to meet the necessities of the case. It is proposed in the new scheme to make special provision for water-closet accommodation for the women employed in the buildings.——Several complaints having been made of the want of efficient ventilation to the underwriters' room at Lloyd's, a number of visits and experiments were carried out, and as a result the Committee of Lloyd's installed an entirely new system of mechanical ventilation which, up to the present, appears to have acted satisfactorily. In this case there were special difficulties to be dealt with. The room is situated on the first floor, and during the busy part of the day is occupied by a very large number of persons. The only way in which ventilation could be successfully carried out was to adopt a system of changing the air by mechanical means. A fan fixed in the basement draws air down a shaft from roof level; the air, heated in the winter and cooled in the summer, is then forced through a system of tubes and distributed in various parts of the room. In addition there is a fan in the roof which extracts the foul air from a number of openings in the ceiling.——In the course of inspection of the drainage of premises in Cloak-lane a portion of the Old Walbrook sewer in a ruinous state was found to be receiving the drainage of several houses. This old sewer was on the line of the old Wall Brook, and formed the boundary of the Ward of Walbrook; for the greater part of its length it ran under the premises between Cloak-lane and Upper Thames-street. The condition being dangerous to health, arrangements have been made for the redraining of the premises in question into the sewers under the public way, the Corporation is some of the cases paying part of the cost of the new drains. The work is practically completed, and the old sewer filled in and bricked up.——A large and increasing proportion of the new drains in the City are now constructed in iron with caulked lead joints. Iron has many advantages over earthenware, viz., the length of the pipes (9 ft. against 2 ft.), enabling a true alignment to be kept, the small number of joints, the fact that a defective joint can be caulked at once, saving delay, the greater resistance to subsidences and vibration, and the expedition with which the works can be carried out, this being an important item in large business premises, and indeed in any case.——During the summer months all the courts and narrow passages throughout the City were regularly flushed under the direction of the City Engineer, who states that in this service and the washing of the main streets last year no less than 60,730,990 gallons of water were used. Disinfectants were also freely applied where necessary.——Smoke nuisances were reported at nineteen premises during 1906. The number of observations recorded amounted to 595, as against 554 noted at 21 premises in 1905. In all cases the service of the usual notices resulted in the abatement of the nuisance, and in no instance has the evidence been sufficient to justify the institution of legal proceedings for abatement of smoke nuisance. Judging from the number of complaints received, there appears to have been a marked improvement of recent years in the reduction of smoke nuisances from business premises, but this can only partially remedy the evil so long as no action can be taken with regard to smoke from domestic premises, and it is very doubtful whether it would be practical to deal with these by legislation. A number of complaints were received during the summer months of nuisance from the smell of cooking, burning fat, etc., in the kitchens of restaurants, entering the windows of offices and other places, and, where practicable, a remedy was suggested to occupiers of kitchens. In one case a pipe-shaft was taken from the basement to the roof level, whilst in another case a shaft was connected to an existing flue at the first-floor level. There seems no reason why occupiers of offices, etc., should have to put up with the smell of cooking from restaurants when by a proper system of mechanical ventilation all the smell of cooking could be discharged above the roof level without annoyance to anyone.

RAILWAY BRIDGE WIDENING, BLACKPOOL.—The improvement to the South Shore railway bridge, known as the "Skew Bridge," at Blackpool, is nearing completion. The plans were prepared by the Borough Surveyor, Mr. J. S. Brodie, and the bridge is of the steel plate girder type (73 ft. span), with brick jack arches for the approaches. The contractors for the ironwork are Messrs. Butterby Company, Derbyshire, and the other contractors for the stone, brickwork, and excavations, Messrs. Tait & Gordon, while the Corporation are doing all the work in connexion with the roadway paving, flagging, and tram lines.

## Foreign.

FRANCE.—The Municipality of Vitry-sur-Seine propose to adapt as their Hôtel de Ville a fine château of the XVIIIth century, with a large park which will be transformed into a public promenade.——M. Rattier, Government architect, has been commissioned to restore the bell-tower of Béthune, which has been classed among "Monuments Historiques" of the XIVth century.——A competition is to be opened to the architects of Lille for designs for a new theatre for that town.——The General Council of the Gironde Department have decided on the construction of a transporter-bridge to unite the two banks of the Garonne. The cost is estimated at 3,400,000 francs.——A monument is to be erected at Bayonne in commemoration of the blockade of the town in 1814. It will be carried out by M. J. Froment Meurice, the sculptor.——A bridge is to be built over the Loire, near Nantes, at a cost of about 800,000 francs.——The Municipality of Besançon have commissioned M. Forieu, the architect, to carry out a General Post Office for the town, at a cost of half a million francs. It will be built with a principal façade on the prolongation of the Rue Proud'hon, and lateral façades on Rue de la République and Rue Gambetta.——M. Ypermann, the painter, who was charged with safeguarding of the paintings of the palace of the Popes at Avignon, has discovered there the remains of a mediæval fresco representing the Crucifixion.——The works undertaken by M. Tournaire, the architect, for the enlargement of the Palais de Justice, at the angle of the Boulévard du Palais and the Quai des Orfèvres, have led to the discovery of a fragment of the wall of the ancient Roman city, the western limit of which had hitherto been unknown.——The Department of Fine-Arts has commissioned from M. Gardet, the well-known animal sculptor, two groups of stags and dogs, which will be placed on each side of the entrance to the Bois de Boulogne at the Porte Dauphine.——In the vestibule of the College de France a fine group of sculpture by Eugène Guillaume has been placed, representing Marguerite de Navarre dictating to François I. the deed of foundation of the College. A marble statue of Orpheus, by the same sculptor, is shortly to be placed in the Petit Palais, having been presented to the city by Mdlle. Guillaume.——The jury in the competition for a new Savings' Bank at Issingeaux have awarded the first premium to M. Joseph Dubuisson, of Lyons.——The Municipality of Cahors have voted half a million francs for important street improvements and new buildings, among them the restoration of the "Tour du Pape," built in the XIVth century by Pope John XXIInd.——A statue of the astronomer Lalande is to be erected in a new square at Bourg (Ain).——The thirty-fifth Congress of French Architects will be held this year from the 16th to the 22nd of June, at Bourges and at Paris. The programme is not yet definitely settled; but there will probably be excursions to Mehun-sur-Yevre, celebrated for the remains of a XIIIth century château which Charles VIIth at one time inhabited; to the Renaissance château of Meillant, built by Georges d'Amboise; to the Cistercian abbey of Noirhac; and to the ruins of St. Amand-Montrond. The distribution of awards which terminates the work of the Congress will take place on the 22nd of June, in the Hemicycle of the Ecole des Beaux-Arts, under the presidency of M. Dujardin-Beaumetz.——There is talk of building hotels at the base of Mont St. Michel, which, unless the Minister of Fine-Arts intervenes to prevent it, will deplorably injure the appearance of this famous mediæval site.——M. Dupont, Senator for the Department of L'Oise, has been appointed President of the French Committee for the organisation of the Anglo-French Exhibition to be held in London in 1908.——The Conseil-Général of the Department of the Seine, in conjunction with the Municipality of Paris, has under consideration a great scheme for the sanitation of the Seine and the Marne. The Department proposes to vote a sum of 5 million francs for the purpose, to which will be added the amount of a loan to be raised by the Paris Municipality.——The jury in the competition opened for the design for a "Maison du Peuple" have awarded the first premium to M. Chêne, architect of Paris——M. Mahl, engineer, is projecting a dam in the valley near Grésin. The reservoir in which the water of the Rhone near the Bellegarde Falls will be stored will have a capacity of two million cubic metres. At Monthon the water will again join the Rhone through a double tunnel 4,500 metres long. This canal will have a fall of 65 metres. The 100,000 h.p. thus gained will be carried to Paris in a current of 65,000 volts.

GERMANY.—The Social Society, founded in 1815, have decided to quit their premises in Unter den Linden and to build a more convenient clubhouse in Charlottenburg. In a competition limited to fifteen architects the first prize for the design of such a building was awarded to Messrs. Kritzler & Lischer, of Berlin.——The Grand Prix offered by the State for works in architecture and painting was not awarded this year, as the competitive designs failed to reach the necessary standard.

AUSTRIA.—It has been decided to replace the old chain bridge at Prague by a new stone bridge, at a cost of 2,160,000 francs. The estimates for an iron bridge came out at from 1,748,000 to 2,070,000 francs, but masonry was selected on

the grounds that good stone is to be found in the neighbourhood, that a masonry structure is more monumental in its effect, and that the lines for the electric tram can be provided with greater facility on such a construction.——The municipality of Vienna proposes to remove the old Chapel of St. John from its present site on the left bank of the Danube Canal, as its æsthetic effect is injured by the proximity of the new shooting gallery. A sum of 10,000k. has been voted towards the cost of the removal.——The Cohn Huss memorial, to be erected in Prague, will be entrusted to the sculptor Salown, who will make certain changes in his present model.——The additions to the Technical Schools, Vienna, have been begun. They will follow in style the main building, and will cost about 900,000 kronen.

SWITZERLAND.—The new secondary school to be built at Kilchberg, near Zurich, will cost 220,000 francs, and will be from the designs of Herr R. Zollinger, of Zurich, who won the work in a limited competition.——The Third International Conference for technical unity in railroad systems took place in Bern on May 6. In 1886 six countries came to an agreement, and as eleven others have joined since then the effect of the Union is felt nearly all over the European continent. Fourteen countries, out of the seventeen who were invited, were represented by sixty-four delegates, the President of the Conference being Herr Robert Winkler, Director of the Technical Department of Swiss Railways.

NORWAY.—At the extremity of the Hardangerfyorf, in Tyssendal, a 400-metre waterfall is to be utilised to produce 28,000 h.p. An English company has undertaken the work.

THE VATICAN.—It is stated that the entire wall which encompasses the beautiful Renaissance garden adjoining the Museum of the Vatican is in a dangerous condition; a length of 100 ft. fell down a few days ago, destroying the orange grove below. The computed cost of reinstating the wall amounts to 5,000*l.*, but the Pope, it is said, has expressed his opinion that in view of the present condition of the Church the expenditure of that sum for such a purpose would be unjustifiable, and that he would rather have the walls dismantled and the garden, however valuable, left to its impending ruin.

## Miscellaneous.

FIREWOOD SPLITTING MACHINE.—Messrs. Hill & Herbert (Leicester) send us an illustration (which, however, is only a view of the machine, and does not explain its working) of their improved firewood splitting machine, for utilising waste timber which would otherwise be discarded. This machine is said to be the result of a good deal of experimenting and improvement, and the makers claim for it that by its safety arrangement it is impossible to wreck the machine should any large nail or bolts by chance get among the wood, as the machine automatically disconnects itself before any damage is done; and that the machine is universal, so that practically any length and thickness of sticks (including thin ones) can be split by a simple adjustment of the machine occupying only a few seconds.

THE INCORPORATED CHURCH BUILDING SOCIETY.—The eighty-ninth annual Report of this Society, for the year ending December 31, 1906, shows that in its past history the Society has been instrumental in aiding in the erection of 2,507 additional new churches, and in assisting in rebuilding, enlarging, or otherwise improving the accommodation in 6,477 other churches or consecrated chapels of ease. By these means more than two million additional seats have been secured, by far the greater part of which are for the free use of the parishioners according to law. The actual amount of money entrusted to the Society and used in making grants towards the objects named has reached 917,761*l.* The Committee take the opportunity of thanking the members of the Committee of Honorary Consulting Architects, who give their services to the Society by examining the designs submitted to them at their monthly meetings, and print a resolution expressing their regret at the loss the Society has sustained by the death of Mr. Micklethwaite, for sixteen years a member of the Committee of Honorary Consulting Architects, and latterly its President. The Committee also deplore the death of Mr. H. A. Prothero, a recently-elected member of the Committee of Honorary Consulting Architects, and whilst deeply regretting the loss to the Society of two such valued members, cordially welcome Mr. E. P. Warren and Mr. W. H. Bidlake, M.A., who have been appointed to fill the vacancies thus created. We have pleasure in adding that we think there could have been no better choice.

POSITION OF ARMY SURVEYORS.—In the Parliamentary Papers Mr. Godfrey Baring asks the Secretary of State for War whether he is aware that there is a body of civil engineers, architects, and surveyors on the staff of the Army, fifty-eight in number, whose position, pay, and prospects have been the subject of three different Committees; and whether he can say it, and when, effect will be given to the recommendations of those Committees.—Mr. Haldane in reply says the question presumably refers to the survey on the Royal Engineering Civil Staff. A scheme has been for some time under consideration by which the prospects of these gentlemen will be improved, and it is hoped that it will be possible to obtain a final decision at an early date.

SAMUEL SMITH MEMORIAL, LIVERPOOL.—The Parks and Gardens Committee of the Liverpool Corporation have allotted a site at the Croxteth Gate entrance to Setton Park for the memorial of the late Right Hon. Samuel Smith which it is proposed to erect. The design has been prepared by Messrs. Willink & Thicknesse, architects, of Liverpool, the sculptor being Mr. Chas. J. Allen, also of Liverpool. The memorial takes the form of a granite obelisk, with medallion portrait in bronze on the base, and with drinking fountains at the sides. The cost is expected to be from 1,500*l.* to 2,000*l.*

IMPROVEMENT OF UNWHOLESOME DWELLINGS, ETC., AT ANCOATS.—At the recent annual meeting of the Ancoats branch of the Citizens' Association for the Improvement of the Unwholesome Dwellings and Surroundings of the People the Hon. Secretary (Mr. B. Lasker), in his report, stated that during the year a deputation brought before the Parks Committee the desire of residents in the neighbourhood to have the open space in front of Victoria Hall, Daniel-street, laid out as a public garden. The Committee promised to give the matter their attention, but nothing has yet been done. The lighting of the district has been considerably improved during the last year. But even now it is far from being perfect. The Sanitary Committee had assured them that some 250 conversions of pail-closets into water-closets are taking place in the city every week, and that other improvements are proceeding at a similar rate. Reliance could not be placed entirely on municipal effort to improve the district. As Mr. Fildes (chairman of the Sanitary Committee) said at the last annual meeting, it needs the constant stimulus of popular opinion to accelerate its measures of reform.

CAMBRIDGE UNIVERSITY.—The Syndicate who were appointed to consider the extension of the Chemical Laboratory have reported in favour of the erection of a building, three stories in height, on the site between the present Medical School and Chemical Laboratory in Pembroke-street. The cost is computed at some 13,500*l.*, to be spent upon the provision of an extensive addition to the Elementary Laboratory, of several smaller laboratories, and a lecture-room. The existing Laboratory was erected in 1887 under the care of Professor Liveing. The Senate have before them a recommendation of the Council relating to the tenure of the Slade Professorship of Fine Art, established in 1869. It is proposed, in view of the definite position now taken in the University by the study of the history and theory of art, that a person who is once re-elected shall hold the professorship for life or until resignation, and that he should deliver at least twenty-four lectures: at present the professorship is held for periods of three years.

HECTOR MACDONALD MEMORIAL, DINGWALL.—On the 23rd inst. the tower which has been erected on the Greenhill, Dingwall, to the memory of the late Sir Hector Macdonald, was opened by the Marquis of Tullibardine. The monument takes the form of a square mediæval keep in the old Scottish style of architecture. The ground floor as well as the view chamber at the top can be used as museum rooms. A circular stair in one corner with two intermediate landings leads to the view chamber, and from thence a small stair on the angle turret ascends to the outside balcony. The base is built of bull-faced ashlar, slightly inclined inwards towards the top on the four faces, and on it are reared the four walls of the structure, built of whinstone with sandstone dressing. Above the entrance door is an inscription panel. The balcony on the top is surrounded by a balustrade. The structure is 100 ft. high and 24 ft. square at the base. Mr. James Sandford Kay, architect, Glasgow, prepared the designs.

THE LATEST NEW YORK TOWER.—As the lofty buildings of New York have eclipsed ordinary structures of reasonable height, so in turn "sky-scrapers" seem destined to be overshadowed by still more ambitious constructions, rising as towers from existing office buildings, with the object of securing the maximum amount of accommodation upon a minimum space of ground. The Singer tower, briefly described in our "Note" of September 29, 1906, will sink into comparative insignificance beside the forty-six-story structure about to be commenced as part of the extension of the Metropolitan Life Insurance Building. The new tower, with the dimensions of 75 ft. by 85 ft., will rise to the total height of 658 ft. above pavement level. Unfortunately its height is its only claim to attention, for, as far as can be judged from published illustrations, it is architecturally a very poor concern, totally without the effect of grandeur which such a tower might have if adequately treated.

HOMES OF CELEBRITIES IN LONDON.—Commemorative tablets will shortly be set up to distinguish the homes of John Howard, No. 23, Great Ormond-street, Queen-square, W.C.; Sir Rowland Hill, No. 1, Orme-square, Bayswater-road (where, we may mention, J. L. Toole, the actor, resided); and Sir Isaac Newton, No. 87, Jermyn-street, St. James's. On quitting Cambridge to take up his appointment as Warden of the Mint in 1695, Newton took the house in Jermyn-street and lived there until his removal to Chelsea in 1709; he was made Master of the Mint in 1699. Dr. Talfourd Ely directs attention to the fact that in the course of alterations now being made in Keppel-street, No. 30, Russell-square, the home of Henry Crabb Robinson, has been pulled down. We find the name of Robinson, as tenant, in the "Directory" of 1865.

## Capital and Labour.

THE SANITARY POTTERY TRADE STRIKE.—At a crowded meeting of the men at Hanley on the 17th inst. it was decided that all the 600 strikers should resume work on Tuesday, 21st inst. Places have been found for all the men who came out. The dispute has lasted for eight weeks. The men have obtained certain concessions, and prices are now more uniform throughout the sanitary ware trade. In wages lost and strike pay the dispute has cost over 15,000*l.*

STATE OF THE BUILDING TRADES.—Employment in April, though still dull, showed a seasonal improvement and was better than a year ago. Returns from 825 firms, employing 59,148 workpeople at the end of April, showed an increase in the number employed of 2.4 per cent. as compared with a month ago. Employment was dull with most branches of the building trades, but, as usual at this time of year, it was good with painters, who frequently worked overtime. Compared with a month ago there was a general improvement with carpenters and painters, and a slight improvement with plumbers, while in Scotland masons and plasterers reported a decline owing, in the case of plasterers, to the gradual completion of term work. Compared with a year ago an improvement was reported by carpenters and plumbers, and a decline by slaters in England, and by masons and plasterers in Scotland. The percentage of Trade Union carpenters and joiners in the United Kingdom unemployed at the end of April was 4.3 as compared with 5.6 a month ago and 5.4 a year ago, the improvement being common to all districts except London. The percentages of Trade Union plumbers unemployed for the same periods were 7.1, 7.8, and 9.6 respectively, employment being better than a year ago in nearly every district.—*Labour Gazette.*

## Patents of the Week.

APPLICATIONS PUBLISHED.*

9,282 of 1906.—A. E. MORGAN and J. S. CURRALL: *Latches for Sliding Doors.*

THIS relates to a latch for sliding doors, provided with one or two spring catches which project within a recess in the front of the latch case in combination with a catch plate made with a hollow projecting part to fit in said recess and having a hole in the front of it with which the catch or catches will engage, suitable means being provided with a sliding or other handle at both sides of the door and connexions to the catch or catches, so arranged that when the handle or the like is pressed in the direction to slide the door open the catch or the catches are released from the catch plate.

9,362 of 1906.—H. S. COLEMAN: *Cowls.*

This relates to a cowl wherein a cone on the shaft has on its external surface a series of radial webs or partitions over which a conical cap is placed, and consists in forming the said cap with a flaring or bell-shaped lower end which rests upon the said webs or partitions, and in arranging in combination therewith a second or deflecting cone.

10,630 of 1906.—W. DIXON: *Controlling Gear for Electric Cranes and like Hoisting Apparatus.*

This relates to an electric crane of the free winding drum type, and consists of an operating lever so mechanically inter-connected to the motor controller and to the brake that when moved in one direction it operates the motor to raise a load, and when moved in the other direction operates the brake to control the loading of the load, with or without a trigger for releasing a circuit breaker when the lever is in mid-position.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

14,028 of 1906.—J. FERGUSON: *Moulds for Forming Slabs or Bricks.*

This relates to a detachable mould composed of rectangular removable sides, ends, and division pieces with or without top and bottom plates, and having external strengthening pieces all temporarily secured together by bolts passing direct through the parts of the mould, and having slots at one or both ends for the reception of cotters.

14,201 of 1906.—A. RADCLIFFE: *Step Ladders.*

This relates to a stay for step ladders, consisting of a bar, preferably of wood, pivoted at one end to the ladder side and passing through a slot arrangement on the opposite side or leg, whereby the action of opening the ladder causes the stay to bind in the slot, thus holding the legs extended.

14,599 of 1906.—H. ILIFF: *Fasteners for Window Sashes, and the like.*

This relates to fasteners for window sashes and the like, and consists of a spindle provided with two cams or a cam and a screw thread so arranged as to draw the sashes together or force them apart on the rotation of the spindle.

14,678 of 1906.—E. COIGNET: *Reinforced Concrete Structures.*

This relates to the construction of reinforced concrete beams, and consists in maintaining constant only the section of the beam which is designed to resist the minimum compressive stresses and gradually increasing the area of the section as and where the compressive stresses increase.

15,582 of 1906.—BABCOCK & WILCOX, LIMITED, and P. PATON: *Conveyors.*

This relates to a chain conveyor comprising a series of trays or plates forming an endless band, in which each tray pivoted on the chain is formed with a rigid projecting arm, arranged to make contact with a curved lever forming a dumper pivoted at any desired point in the upper track of the trays, while on the lower or return track the trays are adapted to hang vertically and allow the material dumped from the upper track to drop freely through.

15,604 of 1906.—A. GRAY: *Hydraulic Valves.*

This relates to a hydraulic valve with metal plugs and seats, having a spindle to actuate the plugs, which is free from end pressure by the fluid with plugs so formed that they are forced upon their seats by the mere pressure required to keep a tight joint, and when forced off their seats by the spindle are in equilibrium, and are not subject to the fluid pressure to again bring them to their seats.

15,631 of 1906.—H. ALTENA: *Apparatus for the Treatment of Wood with Preservative Compositions.*

This relates to an apparatus for impregnating wood with antiseptic liquids and the like, and is characterised by the fact that a caisson floating in the manner of a diving-bell in a holder filled with the impregnating liquid and adapted to be raised by the injector of compressed air and lowered by its discharge, carries the load of wood, provision being made for regulating the speed of ascent and descent by throttling.

15,701 of 1906.—F. S. HOLTON and A. S. GOODHEART: *Window Frame and Sashes.*

This relates to wood frames and sashes, and consists in providing runners adapted to slide on each side of the frame and to support the window sashes between them on open hinges.

16,119 of 1906.—G. CRUMP: *Ashpans for Domestic Firegrates.*

This relates to ashpans for domestic firegrates, comprising in combination an ashpan and a burner or burners or other heating means disposed within or upon the said ashpan and a grid disposed at the top of the said ashpan.

16,231 of 1906.—J. A. MATTHEWMAN: *Means for Securing Windows, and the like.*

This relates to a device for securing sliding windows, comprising in combination a case enclosing a roller carried by a rod and normally under action of a spring forcing it against a gradient, and through a slot in the case, and a lever pivoting in the case and connected to the rod carrying the roller.

17,426 of 1906.—J. LIENING: *Machine for Making Cement Roofing Tiles.*

This relates to a process for the manufacture of cement roofing tiles, and consists in raising the latter together with the loose bottoms on which they rest from the bottom right up to or above the top of the moulds. The invention also consists in the provision of dog pins arranged upon the arms of a spider frame, part of such dog pins being rigidly attached to said spider arms, and part being movable longitudinally and radially to the axis of the spider.

18,000 of 1906.—J. J. DEAL: *Combination Locks.*

This relates to combination locks, and consists of a casing, separable knob spindles and knobs connected thereto, one of the knob spindles having connected thereto a notched head adapted to rotate with the spindle, a gravity bar provided with a T-head, a spindle located in a hollow bearing in a plane below the knob spindles, and a series of lock discs and counting discs mounted upon the hollow bearing and concentric with the spindle located therein. Each lock disc is provided with a notch adapted to receive the lower end of the T-head, said counting discs being provided with tangs, and a disc is provided rotatable with the spindle and provided with a pin adapted to engage the tangs of the counting discs. Counting bars are provided with knobs extended beyond the lock case, and means are provided for actuating the counting discs by the movement of the counting bars and also for connecting the counting discs and lock discs together at predetermined points.

18,960 of 1906.—J. CROSFIELD & SONS, LTD., and R. J. LEE: *Method of Joining Pipes.*

This relates to a method of joining pipes, and consists in making the pipes with their ends coned in such a manner that the cone at the end of one pipe will seat itself against the internal cone at the end of the adjacent pipe, and in screwing on the adjacent ends of the pipes flanges, and finally bolting these flanges together so as to pull the coned ends into intimate metallic contact whereby a tight joint is obtained.

20,187 of 1906.—J. BROOKS: *Cramps for Holding Doors while being Fitted.*

This relates to a support for fitting doors, and consists of arms hinged together, one of the arms serving to lock on the other arm when horizontal therewith, an adjustable arm on one of the hinged arms, means for fastening the adjustable arm to parallel position therewith, and means on the opposite hinged arm to hold the door.

19,111 of 1906.—H. DOVEY: *Tools for Cutting, Planing, and Working Stone and the like.*

This relates to tools for cutting, planing, and working stone and the like of the type in which a renewable cutting blade is employed, and consists in the provision of a sliding screw adjustment for the blade.

21,135 of 1906.—M. ROUX and E. J. WITHERS: *Means for Regulating the Heat and Draught in Open Firegrates or Ranges.*

This relates to a detachable combined draught plate and chimney flue, consisting of a draught plate having a vertical side closing the front entrance to the chimney and a horizontal part covering the top of the fire-chamber in combination with a vertical flue within the chimney, the flue being with or without a flange approximately fitting the interior of the chimney so as to close the passage on the exterior sides of the flue, the interior of which is regulated for draught by a shutter damper.

22,354 of 1906.—F. PIENING: *Door and like Fastenings.*

This relates to door fastenings, and is characterised in that the turning spindle has between the carrying part and handle a piece with a hole which places itself, in the closed position of the handle, against another piece, which is also provided with a hole, and is arranged on the carrying part of the latch plate, through which holes a padlock or the like is passed.

28,414 of 1906.—G. MUSGRAVE and D. MUSGRAVE: *Range Water-Closets.*

This relates to a self-trapping water-closet, the outlet of which is formed as or with a lateral passage having one or two lateral openings by means of which such closet can be connected to or included in a lateral pipe for use as a range closet.

29,227 of 1906.—C. MAYER: *Furnace for Burning Glass, Porcelain, Majolica, Stone Ware, and like articles.*

This relates to a continuous muffle furnace with two transporting carriages adapted to be raised and moved laterally at both sides of the burning chamber, which carriages, operating oppositely to each other, lift off freely and laterally the articles to be burnt, the supporting arms of the carriages being withdrawn from the burning chamber after the completion of the lateral movement.

446 of 1907.—G. E. HUMPHRIES: *Windows.*

This relates to a sash window wherein the sashes are supported in their cleaning position by means of their sash lines and are locked in their closed or ventilating position by means of spring catches, which are adapted to be released when the sashes are to be swung into the room.

2,701 of 1907.—BENRATHER MASCHINENFABRIK AKT. GES.: *Rotary Tower Cranes.*

This relates to a tower crane having a rotatable duplicated jib, a supplemental traveller capable of running over the said jib, and provided with an arm projecting laterally beyond the jib so that small loads may be conveyed from one side of the tower of the crane to the other without its being necessary to turn the jib.

2,916 of 1906.—C. G. LAMBERT and A. G. LAMBERT: *Method for the Ventilation and Humidification of Work and other Rooms and Apparatus therefor.*

This relates to a method for the ventilation and humidification of work and other rooms in which the mixture of air and water is made in the room itself, the water atomisers being arranged above a pipe which distributes the air by means of orifices in such a manner as to form layers of atomised water and air adjacent to and coming the one above the other, and which traverse the room from top to bottom, each molecule of water being surrounded by the entire quantity of air which it is to humidify.

2,969 of 1907.—J. LEVICK: *Folding Lavatories.*

This relates to a folding lavatory provided with a drainage wheel in the lower part of the casing, and consists in the employment of an inwardly projecting ledge or rim carried by a length or insertion strip secured to the inside of the front wall of the said well.

3,365 of 1907.—C. CHAPMAN: *A Down Draught Preventing Chimney Cowl.*

This relates to a down draught preventing cowl, and consists in the combination of a revolving hood and louvres.

6,695 of 1907.—R. BENNETT: *Means for Strengthening the Ends of Planks used for Scaffolding and Building and Other Purposes.*

This relates to means for strengthening the ends of planks to prevent splitting by inserting end plates of metal or other material secured to the plank by screws, bolts, or the like passing through the thickness of the plank and through holes in the end plates.

15,794 of 1906.—G. H. VERSTRAELEN: *A Mould for Building Stones.*

This relates to a mould for building stones characterised by the adjustability of its walls, each longitudinal wall and cross wall consisting of a rectangular bent metal plate guided on the base of the mould and provided with handles, and further characterised by mechanisms adapted to engage said walls while filling the mould, and to release said walls automatically when emptying the mould.

15,862 of 1906.—A. R. RIDOUT: *Method of and Means for Inspecting Sewers, Drains, and such like.*

This relates to a method of inspecting underground sewers, drains, and the like from the ground surface (without descending), consisting in using in connexion with the usual illuminating apparatus a reflecting plane or the like at the lower end of a rod or suspender which is let down a manhole or the like from the road surface to the level of the sewer and illuminating apparatus, and which can be moved about and will permit of the condition of the sewer between the illuminating apparatus and the reflector being properly reflected to the road surface.

17,707 of 1906.—A. JANSEN: *Centering for use in the Construction of Arches.*

This relates to improvements in centering for use in the construction of arches, characterised in that two flat segmental rods of equal radius which are secured in any suitable manner to the iron beams between which the centering is to be stretched are adapted to determine the width of the centering by being shifted nearer to or farther from each other, and are fixed in their respective positions by means of a key.

23,790 of 1906.—A. BACHMANN: *Pipe Couplings.*

This relates to a pipe coupling employing loose connecting pieces engaging the pipe ends and operated by an enclosing sleeve with an internal cam surface, and consists of a sleeve having cylindrical faces holding the connecting pieces in locked position, recesses to receive the said pieces when disengaged, cam surfaces at one side of the recesses, and projecting noses effecting the disengagement of the connecting pieces on turning the sleeve through an angle.

24,323 of 1906.—H. L. DOULTON and C. E. MORRIS: *Pipe Joints.*

This relates to a pipe joint consisting of socket, a spigot fixing the socket having a collar at such a distance from its end that a space is left between the end of the socket and the collar, and an external band of porous material having its edges secured to socket and spigot and covering over this space except at the stop.

24,699 of 1906.—A. J. M. CHAPPLE: *Pipe Coupling.*

This relates to a pipe coupling of the type comprising two ends or heads provided with extensions or wings, and consists in coupling the links journalled to the wings of one of the heads, and in providing an eccentric disc journalled at the free end of each link, and adapted during rotation to force the heads together upon their joints, and locking mechanism comprising a spring, a stop pin thereon and means for operating the spring.

# List of Competitions, Contracts, etc.

**For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xviii.; Auction Sales, xxxii.**

**Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.**

**The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.**

***** It must be understood that the following paragraphs are printed as news, and not as advertisements: and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.**

## Competitions.

MAY 31.—**Alston.**—SCHOOL.—Cumberland Education Committee invite architects to submit sketch plans, with outline, specification, and estimate, for a dual secondary school at Alston, Cumberland, on a site which can be pointed out, for about fifty boys and girls. The plans, which must be in acordance with the regulations of the Board of Education, will be received at the office of Mr. C. Courtenay Hodgson, Secretary, The Courts, Carlisle.

JULY 2.—**Kilkenny.**—LIBRARY.—Kilkenny Corporation invite competitive designs, specification, and bill of quantities for the erection of a Carnegie free library. Cost of building not to exceed 1,800*l.* Designs to be sent to Mr. Edward O'Connell, Town Clerk, City Hall, Kilkenny.

SEPTEMBER 2.—**Gothenburg.**—QUAY AND WHARF.—At the request of the T.C., the Harbour Board of Gothenburg invite entries to the International Prize Competition for plans for quay and wharf constructions in the proposed new freight harbour at Sannegardsviken, Gothenburg. Regulations and survey charts may be obtained by sending in an application, together with 10 Swedish crowns, to Göteborgs Stads Byggnadskontor, Marten Krakowkatan No. 5, where further information may be obtained from the Secretary.

## Contracts.

### BUILDING.

MAY 25.—**Canterbury.**—RESTORATION OF CHURCH.—For the restoration of Holy Cross Church, Canterbury. Plans and specifications at the office of Messrs. Jennings & Gray, architects, 4, St. Margaret's-street, Canterbury, where also a copy of the bills of quantities may be obtained on depositing the sum of 5*l.*

MAY 25.—**Harrogate.**—COTTAGE HOMES.—One pair of cottage homes proposed to be erected at Pannal Ash, Harrogate, for the Committee of the Primitive Methodist Orphanage. Names, with particulars of the trades required, to Messrs. Roger Oldham & Thos. J. Hill, architects, 55, Cross-street, Manchester.

MAY 26.—**Darnall, Sheffield.**—SCHOOL.—Sheffield Education Committee invite tenders for the whole of the works required in the erection of a new public Elementary School at Whitby-road, Darnall. Names to the architects, Messrs. Potter & Sandford, 16, St. James's-row, Sheffield, together with a deposit of 1*l.* 1s. for bill of quantities.

MAY 27.—**Bridgwater.**—PLAYSHEDS AT EASTOVER.—The Bridgwater Borough Education Authority invite tenders for the erection of covered playshed in the boys' playground and for the alteration to partition of existing shed between the girls' and boys' playground at the Eastover Council School. The plans, conditions of contract, and specification can now be seen, and forms of tender obtained, at the office of the Borough Surveyor, Municipal Buildings, High-street.

MAY 27.—**Britonferry.**—SCHOOL.—The Glamorgan C.C. invite tenders for the erection of a new school at Britonferry. Plans and specification may be seen, and copies of the bills of quantities obtained, at the Britonferry Police-station and at the Glamorgan County Offices, Westgate-street, Cardiff.

MAY 27.—**Darlington.**—SCHOOL.—Darlington B.C., acting at the Education Authority, invite tenders for the erection of a new school for 420 children in Corporation-road. Plans and specification may be seen, and bill of quantities and form of tender obtained, at the offices of Mr. George Winter, Borough Surveyor and Waterworks Engineer, Town Hall, on depositing a cheque for 2*l.* 2s.

MAY 27.—**Darlington.**—WORK AT CHURCH.—Darlington Corporation invite tenders for setting back the south-east corner of St. Hilda's Church, Parkgate, and rebuilding the boundary wall, etc. Plans and specification may be seen, and bill of quantities and form of tender obtained, at the offices of Mr. George Winter, Borough Surveyor and Waterworks Engineer, Town Hall, on depositing a cheque for 2*l.* 2s.

MAY 27.—**Lochgelly.**—RECONSTRUCTION.—The mason and brick, joiner, plumber, slater, plaster, and painter works in connection with the proposed reconstruction of the Victoria Bar, Church-street, Lochgelly, for Mr. D. Paton. Plans can be seen, and schedules of quantities obtained, on application to Mr. T. Hyslop Ure, architect, 43, Carnegie-street, Dunfermline.

MAY 27.—**Ripon.**—BUSINESS PREMISES.—The erection of business premises, Fishergate, Ripon. Plans and specifications may be seen on application to Mr. John Rayner, Market-place, Ripon.

MAY 28.—**Belfast.**—ADDITIONS TO PREMISES.—Building and completing an addition to the premises of Messrs. W. & G. Baird, Ltd. Plans and specifications and conditions of contract may be seen at offices of Mr. Henry Seaver, architect, Scottish Temperance Buildings, Belfast. Quantities have been prepared, and may be had on application to Mr. Acheson Ferguson, Building Surveyor, Wellington-place.

MAY 28.—**Bolton.**—HOSPITAL EXTENSION.—Bolton Guardians invite tenders from builders and contractors carrying on business within the Bolton Union for the erection of two new pavilions in connexion with the Townleys Hospital and a residence for the medical officer. Plans may be seen, and quantities obtained, from Mr. Samuel Coope, F.S.I., architect, 24, Mawdsley-street, Bolton. A deposit of 5*l.* 5s. must be made on application for bills of quantities.

MAY 28.—**Fosdyke Bridge.**—WAREHOUSE.—The River Welland Outfall Trustees invite tenders for the erection of a warehouse at Fosdyke Bridge. Plans and specifications can be seen at the Welland Office, Fosdyke Bridge.

MAY 28.—**Hopeman.**—POST-OFFICE.—The mason, carpenter, plumber, slater, plaster, and painter works at new post-office buildings, to be erected at Hopeman. The plans and specifications may be seen with Mr. John Wittet, architect, Elgin.

MAY 28.—**Shoeburyness.**—CONCRETE FOUNDATIONS.—Shoeburyness U.D.C. invite tenders for excavating and providing concrete foundations for a new gas holder about to be erected at their Gasworks, Shoeburyness. Specification and particulars can be had from the Council's Surveyor, Mr. H. A. Harris, Clarence-street, Southend.

MAY 28.—**Thurles.**—BUILDING WORKS.—The carrying out of certain building works, sanitary, plumbing, and hot-water supply at St. Patrick's Diocesan College, Thurles. Drawings and specification may be inspected at the College, or at the office of Messrs. Doolin, Butler, & Donnelly, architects, Dawson-chambers, Dublin.

MAY 29.—**Brindley.**—SCHOOL.—The Administrative Sub-Committee for the Nantwich Union area, County of Chester, invite tenders for alterations and additions to the school buildings, Brindley, near Nantwich. Plans and specifications can be seen at the office of Mr. R. Matthews, architect, Parr's Bank-chambers, Nantwich, and quantities obtained on deposit of 1*l.*

MAY 29.—**Lossiemouth.**—STORE.—The concrete and carpenter works of a new store to be erected on the Lossiemouth Harbour Company's grounds for the Aberdeen Commercial Company. The plans and specifications may be seen with Mr. John Wittet, architect, Elgin.

MAY 30.—**Paisley.**—AMMONIA PLANT HOUSE.—The Paisley Gas Corporation invite tenders for the erection of an ammonia plant house, 67 ft. by 42 ft. 9 in. wide, at their Gasworks, Blackstoun-road. Specifications and schedules of quantities may be obtained on application to Mr. George R. Hislop, Engineer and Manager, Paisley Gasworks.

MAY 31.—**Dunfermline.**—BUSINESS PREMISES.—The mason, joiner, plumber, plaster, and slater works of proposed new business premises, Queen Anne-street, for Mr. John M'Intyre, auctioneer. Plans and specifications may be seen, and all further information obtained, on application to Mr. James T. Scobie, architect, with whom schedules of measurement may be had.

MAY 31.—**Hakin and Milford Haven.**—LOCK-UP, ETC.—Pembrokeshire C.C. invite tenders for the erection of a lock-up at Hakin, and a petty sessions room at Milford Haven. Plans and specifications may be seen at the office of the Assistant County Surveyor, Mr. Arthur H. Thomas, St. Thomas Green, Haverfordwest.

MAY 31.—**Hartlepool Station, Durham.**—LIFEBOAT-HOUSE AND SLIPWAY.—The Hon. Secretary of the Royal National Lifeboat Institution, Hartlepool Branch, invite tenders for the construction of a lifeboat-house and slipways for the Royal National Lifeboat Institution at Middleton. Contract drawings, etc., may be seen on application to Mr. Alfred Belk, Hon. Secretary, Borough-buildings, Hartlepool, Durham; or at the office of the Engineer and Architect to the Royal National Lifeboat Institution, Mr. W. T Douglass, 15, Victoria-street, Westminster, S.W. Copies of the form of tender, etc., may be obtained on application to the Engineer and Architect upon payment of a deposit of 1*l.* 1s.

MAY 31.—**Hayes and Streatham.**—HOUSES.—No. 1, for the erection of six dwelling-houses at Hayes, Middlesex; No. 2, for the erection of four sale shops and dwelling-houses at Hayes, Middlesex; No. 3, for the erection of six villas at Streatham. Names, accompanied by remittance of 1*l.* 1s. for each contract to be tendered for, to Messrs. Trevor & Taaffe, surveyors, 22, Norfolk-row, Sheffield, or 70, Finsbury-pavement, E.C.

MAY 31.—**Kelly Bray.**—HOUSE.—The erection of a dwelling-house and shop at Kelly Bray, for Mr. D. Guest. Plans, specifications, etc., may be seen by applying to Mr. Lawrence Scantlebury, architect and surveyor, Callington.

MAY 31.—**Merthyr Tydfil.**—ADDITION TO INFIRMARY.—Merthyr Tydfil Guardians invite tenders for the erection of an addition to the Infirmary at the Union Workhouse, Merthyr Tydfil. Plans and specification may be seen, and bills of quantities obtained, at the offices of the architect, Mr. Thomas Roderick, Clifton-street, Aberdare.

MAY 31.—**Peterston-super-Ely.**—VESTRY.—The erection of a vestry on Croes-y-parc Chapel ground, Peterston-super-Ely, near G.W.R. Plans and specification can be seen at the office of Mr. J. G. Harold Bird, C.R.S.I., High-street, Cowbridge.

MAY 31.—**Thorganby.**—RESEATING CHURCH.—For reseating and other works to Thorganby Church, near Grimsby. Plans and specification can be inspected on application at Mr. T. Elliott's house, Thorganby.

JUNE 1.—**New Tredegar.**—SCHOOLROOM.—The erection of a new schoolroom, etc., for the Trustees of the English Wesleyan Church, New Tredegar. Plans and specification and full particulars may be obtained of Mr. D. W. Price, architect, New Tredegar.

* JUNE 3.—**Bridlington.**—FOG-SIGNAL HOUSE.—The Corporation of Trinity House invite tenders for new fog-signal house and alterations to the dwelling, etc., on Flamborough Head, near Bridlington, Yorks. For further particulars refer to an advertisement in this issue.

JUNE 3.—**Flambro' Head.**—FOG-SIGNAL HOUSE.—Trinity House invite tenders for the erection of a fog-signal house, alterations to the existing dwelling, etc., on Flambro' Head. The plans may be inspected, and forms of tender, etc., obtained, either at this House, between the hours of 10 a.m. and 5 p.m., or on application to the Principal Keeper, Flambro' Lighthouse, near Bridlington, Yorks. Applicants, when receiving a form of tender and specification, will be required to deposit 1*l.*, on producing the receipt for which at the offices of Messrs. Corduroy, Selby, & Corduroy, 21, Queen Anne's-gate, S.W., they can obtain the surveyor's quantities in connection with the work.

JUNE 3.—**Fraserburgh.**—POST-OFFICE.—The mason, carpenter, slater, plaster, plumber, painter, glazier, and iron works of new post-office to be erected in Fraserburgh. Plans and specifications may be seen with the architects, Messrs. Reid & M'Robbie, Saltoun-chambers, Fraserburgh.

JUNE 4.—**Banbury.**—ENGINE-SHED.—Great Western Railway Directors invite tenders for the construction of a new engine-shed and other works at Banbury. Plans and specification may be seen, and forms of tender and bills of quantities obtained, at the office of the New Works Engineer, Paddington Station, London.

JUNE 4.—**Cardiff.**—REFRESHMENT ROOM.—Great Western Railway Directors invite tenders for the provision of a new refreshment room at Cardiff Station. Plans and specification may be seen, and forms of tender and bills of quantities obtained, at the office of the engineer, at Newport Station, between the hours of 10 a.m. and 4 p.m.

JUNE 4.—**Keighley.**—LAUNDRY.—The various works required in the erection of a laundry, off West-lane, Keighley, for the Keighley and District Co-operative Laundries' Association, Ltd. Plans may be seen, and quantities obtained, at offices of Messrs. John Haggas & Sons, architects, North-street, Keighley.

JUNE 4.—**Lydford.**—CHAPEL AND SCHOOL.—The construction of a new chapel and school at Lydford. Plans and specifications may be seen in the schoolroom of Tavistock Bible Christian Chapel. For their own convenience, builders are advised to make appointment with Rev. L. H. Court, 49, Bannawell-street, Tavistock, for inspection of plans, etc.

JUNE 4.—**Stretford.**—SCHOOL.—Stretford Education Committee invite tenders for the extension of a public Elementary School, at Henshaw-street, Stretford. Plans may be seen, and bill of quantities obtained, on application to the architect, Mr. Ernest Woodhouse, F.R.I.B.A., 88, Mosley-street, Manchester, on payment of a fee of 2*l.* 2s.

* JUNE 4.—**Victoria Park, N.E.**—ALTERATIONS.—The Bethnal Green Board of Guardians invite tenders for structural and other alterations to the kitchen, dining-hall, etc., of Workhouse, Waterloo-road, Victoria Park, N.E. For further particulars refer to an advertisement in this issue.

* JUNE 4.—**Warwickshire.**—STATION.—The Directors of the G.W.R. Company invite tenders for erection of new station buildings at Wilmcote, Warwickshire. For further particulars see advertisement in this issue.

JUNE 5.—**Bradford.**—SCHOOLS.—Various works required in the erection of Muff Field Wesleyan Reform Sunday Schools, Bowling Old-lane, Bradford. For quantities apply to Messrs. Walker & Collinson, architects, Cheapside-chambers, Bradford.

JULY 5.—**S. Ervan.**—CHAPEL.—The erection of a Wesleyan Chapel at S. Ervan Village, S. Issey, R.S.O., near Padstow, for the Trustees. Plans and specification may be seen on applying to the caretaker at S. Ervan.

JUNE 6.—**Aberffraw and Canol Rhos.**—ADDITIONS, ETC., TO SCHOOL.—For additions and alterations to the Council School, Aberffraw, and also for the erection of a farm cottage at Canol Rhos, near Llangefni, for the Anglesey Education Committee. Plans and specifications may be inspected at the Council School, Aberffraw, and at Canol Rhos, Llan-

gefni, respectively, and also at the architect's office, Menai Bridge. Forms to be obtained on application to the architect, Mr. Jos. Owen, F.R.I.B.A., Menai Bridge and Holyhead.

JUNE 6.—**Hastings.**—ALTERATIONS TO LODGE.—Hastings Corporation invite tenders for alterations to the entrance-lodge at the Hastings Borough Cemetery. Drawings may be seen, and form of tender and specification obtained, at the office of Mr. P. H. Palmer, M.Inst.C.E., Borough Engineer, Town Hall, Hastings, between the hours of 10 a.m. and 5 p.m.

JUNE 8.—**Barry.**—HOSPITAL.—Barry U.D.C. invite tenders for the erection of a general accident and surgical hospital at Wyndham-street, Barry. Plans and specifications may be seen, and bills of quantities obtained, at the office of the surveyor (Mr. J. C. Pardoe), 160, Holton-road, Barry, on payment of 2*l.* 2s.

JUNE 8.—**Stainland.**—MILL.—The erection of a fireproof mill, at Dog-lane Mills, Stainland, for Messrs. B. Taylor & Sons. Plans, specifications, and detail drawings will lay for inspection, and quantities may be obtained, at offices of Messrs. Chas. F. Horsfall & Son, architects, Lord-street-chambers, Halifax.

JUNE 8.—**Sturminster Newton.**—CHURCH ROOF, ETC., WORK.—The Vicar and Churchwardens invite tenders for the restoration of the roof and underpinning the walls of the Parish Church of Sturminster Newton. The specifications may be seen at Mr. H. R. Chapman's.

JUNE 10.—**Tonyrefail.**—HOUSES.—The erection of fifty-four dwelling-houses on the Capel Estate, Tonyrefail, for "The Rhondda Tonyrefail Building Club." Plans and specifications can be seen, and form of tender obtained, from the architect, Mr. Rhys S. Griffiths, M.S.A., Tonypandy, Rhondda.

* JUNE 11.—**Chelmsford.**—NEW POST-OFFICE.—The Commissioners of H.M. Works and Public Buildings invite tenders for a new post-office at Chelmsford. For further particulars refer to an advertisement in this issue.

JUNE 11.—**Mortlake.**—EXTENSION OF ELECTRICITY WORKS.—The U.D.C. of Barnes invite tenders for the erection of an extension of their electricity works, High-street, Mortlake, S.W. The drawings and specification can be seen, and bills of quantities and forms of tender obtained, on application to the Engineer and Surveyor at the Council House. The sum of 1*l.* 1s. will be required as a deposit.

* JUNE 12.—**Leicester.**—ISOLATION HOSPITAL.—The Committee of Visitors of the Leicestershire and Rutland County Lunatic Asylum invite tenders for erection and completion of an isolation hospital at the new asylum, Narborough, near Leicester. For further particulars refer to an advertisement in this issue.

JUNE 14.—**Crosby.**—SCHOOL.—Lindsey C.C. Education Committee invite tenders for the erection of an Elementary School at Crosby, near Scunthorpe. Bills of quantities and form of tender may be had on application to Messrs. Scorer & Gamble, architects, Bank-street-chambers, Lincoln, and on payment to them of 2*l.* 2s. The drawings and conditions of contract may be inspected at the offices of the architects.

* JUNE 19.—**London.**—ALTERATIONS.—The Guardians of the Parish of Paddington invite tenders for alterations at their Workhouse and Infirmary in Harrow-road, W. For further particulars refer to an advertisement in this issue.

* JUNE 19.—**St. Helens.**—SCHOOL.—The St. Helens B.C. invite tenders for erection of new schools in College-street, St. Helens. For further particulars see advertisement in this issue.

* JUNE 25.—**Hill End.**—ASYLUM.—Tenders are invited for erection of additional works at the Hertfordshire C.C. Asylum, Hill End, near St. Albans. For further particulars see advertisement in this issue.

NO DATE.—**Bacup.**—COTTAGES.—For the erection of nine cottages for Bacup Co-operative Store. Names to Mr. Worcester, architect, Baloon-street, Manchester.

NO DATE.—**Calverley.**—HOUSE, ETC.—The various works required to be done in the erection of a detached house, gardener's cottage, etc., situate Clara Drive, Caverley, for Mr. Thomas Whitfield. Names to Mr. H. W. Long, architect and surveyor, Greengates, Bradford.

NO DATE.—**Hull.**—PREMISES.—For erecting new fish-curing premises, stables, dwelling-house, etc. Apply Messrs. Freeman, Son, & Gaskell, architects, Carr-lane, Hull.

NO DATE.—**London.**—ALTERATIONS AT WORKHOUSE.—Stepney Guardians invite tenders for the carrying out of certain alterations at their workhouse, St. Leonard-street, Bromley-by-Bow, E. For copy of specification, etc., apply to the Master of the Workhouse between the hours of 10 and 12 a.m.

NO DATE.—**Morecambe.**—ALTERATIONS TO CHURCH.—The alteration at the Emmanuel Church, Morecambe. Names and addresses to Mr. Gorton, architect, Morecambe.

## ENGINEERING, IRON, AND STEEL.

MAY 27.—**Darlington.**—STEEL GIRDERS.—The North-Eastern Railway Directors invite tenders for the supply of sixty-two steel girders of about 30 ft. span, weighing in all about 225 tons. Plans and specification may be seen, and detailed quantities and form of tender obtained, on personal application to the office of Mr W. J. Cudworth, the Company's Engineer, at York.

MAY 28.—**Drumcairn.**—BRIDGE.—Armagh R.D.C. invite tenders for rebuilding Geary's Bridge, over the River Callan, on the main road from Armagh to Moy, in the townland of Drumcairn, close to Armagh, the work to be carried out in accordance with plan and specification prepared by Mr. R. H. Dorman, County Surveyor. Forms of tender may be obtained at office of Mr. W. Calvert, Clerk of the Council, Clerk's Office, Workhouse, Armagh.

MAY 28.—**London.**—CARRIAGE UNDERFRAMES.—Tenders invited for supply of:—(1) Carriage underframes, 5 ft. 6 in. gauge; (2) carriage underframes, metre gauge. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W.

MAY 29.—**London.**—WHEELS.—The East Indian Railway Company invite tenders for the supply and delivery of wheels and axles for wagons and brake vans as per specification to be seen at the Company's offices. For each specification a fee of 1*l.* 1s. is charged, which cannot, under any circumstances, be returned. Mr. C. W. Young, Secretary, Nicholas-lane, London, E.C.

MAY 30.—**Paisley.**—IRON ROOF.—The Paisley Gas Corporation invite tenders for the erection of an iron roof, 67 ft. by 42 ft. 9 in., at their Gasworks, Blackstoun-road. Specifications and schedules may be had on application to Mr. George R. Hislop, Engineer and Manager, Paisley Gasworks.

MAY 31.—**Avonmouth, Bristol.**—RAILWAYS AND SIDINGS.—Bristol Docks Committee invite tenders for the construction and maintenance for twelve months after completion of certain railways and sidings, at the Royal Edward Docks, now in course of construction at Avonmouth. Copies of the specification, etc., may be obtained from Mr. W. W. Squire, Engineer, Engineer's Office, Cumberland Basin, Bristol, on production of a receipt showing that a deposit of 5*l.* has been paid to the Secretary of the Docks Committee, 19, Queen-square, Bristol.

MAY 31.—**Ayr.**—BREAKWATER.—The Ayr Harbour Trustees invite tenders for reducing the length of the existing breakwater at Ayr Harbour, and constructing a new end. The plans may be seen at the office of the engineers, Messrs. Crouch and Hogg, C.E., 14, Blythswood-square, Glasgow. Copies of the specification, schedule, and form of tender may be obtained from the engineers on payment of 2*l.* 2s. An assistant engineer will meet contractors at the Harbour Master's office, Ayr Harbour, at 2 p.m. on May 27 to show them the site of the works.

MAY 31.—**Valletta.**—CAST-IRON PIPES.—Tenders will be received at the office of the Receiver-General and Director of Contracts, Valletta, up to 11 a.m. on May 31 for the supply of cast-iron pipes and irregular castings. Tenders are to be accompanied with a deposit of 300*l.*, to be made in the office of the Crown Agents, by tenderers residing in Great Britain not having a representative in Malta. Particulars, specification, etc., may be obtained on application at office of the Crown Agents for the Colonies, Whitehall-gardens, London.

MAY 31.—**Waltham.**—BRIDGE.—The Essex C.C. invite tenders for taking down and rebuilding the bridge over the Cobbin Brook in the Parish of Waltham Holy Cross. Drawings and draft contract can be seen, and specification, form of tender, etc., obtained, at office of Mr. Percy J. Sheidon, M.Inst.C.E., Chief Surveyor, Office of the Chief Surveyor, Chelmsford.

JUNE 1.—**Manchester.**—STEEL JOISTS.—Manchester Rivers Committee invite tenders for the supply and delivery to the Corporation Sewage Works, Davyhulme, Urmston, of 1,010 rolled steel joists. Forms of tender may be obtained on application to the Secretary of the Rivers Department, Town Hall, Manchester.

JUNE 3.—**Nelson.**—BOILER.—Nelson Electricity Committee invite tenders for one Lancashire boiler, with superheater and steam pipes. Specifications, general conditions, and forms of tender may be obtained upon application to Mr. D. Helme, Borough Electrical Engineer, Electricity Works, Nelson, on payment of 1*l.* 1s. (cheque to be made payable to Nelson Corporation, and crossed).

JUNE 5.—**Gloucester.**—HEATING, ETC.—Gloucester United Schools Governors invite tenders for the heating and ventilation of the school about to be erected in Denmark-road, Gloucester. Plans and specification may be seen, and forms of tender obtained, at the offices of the engineer, Mr. E. J. Cullis, A.M.Inst.C.E., of Southgate-chambers, Gloucester. One set of tracings of the plans and a copy of the specification may be had on payment of 1*l.* 1s.

JUNE 5.—**Warminster.**—PLANT.—Warminster U.D.C. invite tenders for gas suction plant and gas-engine, with shafting, etc. Specifications may be obtained, and drawings inspected, at the offices of Professor Henry Robinson, M.Inst.C.E., Parliament-mansions, Victoria-street, Westminster, S.W.

JUNE 7.—**Chesterfield.**—CAST-IRON TOWER.—The Chesterfield Gas and Water Board invite tenders for the manufacture and erection of a cast-iron outlet valve tower for a reservoir. Copies of specification and photo-prints may be obtained on payment of a deposit of 2*l.* at the offices of the Board, 24, Glumman-gate, Chesterfield, where a coloured copy of drawing may be also inspected.

JUNE 12.—**Saltley.**—RIVER IMPROVEMENTS.—Birmingham Public Works Committee invite tenders for the construction of flood works in connexion with the improvement of the River Rea at Saltley, together with works on adjoining properties incidental thereto. The plans and general conditions may be seen, and the specification of works, bill of quantities, and forms of tender obtained, at office of Mr. Henry E. Stilgoe, M.Inst.C.E., City Engineer and Surveyor, The Council House, Birmingham.

JUNE 20.—**Seacombe.**—PLANT.—Wallasey U.D.C. invite tenders for the supply, delivery, erection, and completion of a sulphate of ammonia plant of three tons per diem capacity, at their Gasworks, Dock-road, Seacombe. Plans and specifications may be seen, and particulars and form of tender obtained, on application to the engineer, Mr. J. H. Crowther, at his office at the works.

JUNE 20.—**Seacombe.**—RETORT FITTINGS.—Wallasey U.D.C. invite tenders for the manufacture, delivery, erection, and completion of retort fittings, etc., at their retort house, at the Gasworks, Dock-road, Seacombe. Plans and specification may be seen, and forms of tender and any information obtained, on application to the engineer, Mr. J. H. Crowther, at his office at the works.

## MISCELLANEOUS.

MAY 27.—**Paul.**—CARTING.—Paul U.D.C. invite tenders for the carting of stone from the Segoulder Quarry. They also invite tenders for the breaking of this stone. Mr. William Curnow, Clerk to Council.

MAY 27.—**Poole.**—SCAVENGING.—The collection and disposal of house refuse. Tenders to be given for (*a*) Western District, (*b*) Eastern District, and to be for periods of either one or three years. Particulars may be obtained on application to the Borough Surveyor, Mr. Samuel J. Newman, F.R.I.B.A., King-street, Poole.

MAY 28.—**Portslade.**—REMOVAL OF REFUSE.—Portslade-by-Sea U.D.C. invite tenders for the removal of house refuse (*a*) weekly, and (*b*) fortnightly, from July 1, 1907, to June 30, 1908. Forms of tenders and further particulars can be obtained from the Surveyor, 46, St. Andrew's-road, Portslade-by-Sea.

MAY 29.—**Felixstowe.**—BANDSTAND.—The U.D.C. of Felixstowe and Walton invite tenders for the delivery and fixing of a bandstand, octagonal on plan, and 24 ft. centre to centre of columns across the structure, and including wind screens. The stand to be Messrs. Hill & Smith, of Brierley Hill, Staffs., No. 980 pattern, drawings of which may be seen at the office of the Surveyor, Mr. Harry Clegg, A.M.Inst.C.E., Town Hall, Felixstowe.

MAY 30.—**South Stoneham.**—STEAM ROLLING.—South Stoneham R.D.C. invite tenders for steam rolling the county roads in the above district. Forms of tender can be obtained upon application at the address of Mr. E. T. Westlake, Clerk, 20, Portland-street, Southampton. Any further particulars may be obtained of Mr. W. J. Potter, District Surveyor, "Glenroy," Portswood.

MAY 30.—**Pontypool.**—RECREATION GROUND.—The levelling of the Recreation Grounds, Pontypool; also the relaying of a sewer, manholes, and surface drains. Drawings and specification may be seen at the offices of Mr. D. M. Llewellin, F.G.S., C. and M.E., Glanwern offices, Pontypool, Mon.

JUNE 1.—**Lewisham.**—BRICK GRAVES, ETC.—The Cemeteries Committee invite tenders for building brick graves and vaults, supplying York ledgers, taking down and replacing headstones, etc., at the Borough Cemeteries at Ladywell and Hither Green, during the three years from midsummer, 1907. Specifications of the work, with forms of tender, etc., may be obtained on application to Mr. Edward H. Oxenham, Clerk to the Committee, Lewisham Town Hall, Catford, S.E.

JUNE 3.—**Hexham.**—KITCHEN RANGE, ETC.—Hexham Guardians invite tenders for repairing the present and, alternatively, for putting in a new kitchen range and boiler at Hexham Workhouse. The present range and boiler can be seen at any time on application to the Master.

JUNE 3.—**Ledbury.**—BURIAL-GROUND.—Ledbury Joint Burial Committee invite tenders for the laying-out of the additional land at their Cemetery, building walls, and subsoil draining. Plans, sections, and specification may be seen and bills of quantities and forms of tender obtained, on application to Mr. R. G. Gurney, P.A.S.I., Surveyor, Worcester-road, Ledbury, on deposit of 1*l.*

JUNE 3.—**Orsett.**—CARTAGE.—Orsett R.D.C. invite tenders for the cartage of materials. A schedule, showing approximately the quantities of material and distances to be carted, and form of agreement, can be obtained from the Highways Surveyor, Mr. F. T. Johnson; or at the Clerk's office, 2, Orsett-road, Grays.

JUNE 3.—**Settle.**—MOTOR-CART.—Settle R.D.C. invite tenders for a steam motor-cart of a net weight (unloaded) of not exceeding 5 tons, and to carry about 5 tons. Any further particulars may be obtained from Mr. E. W. Ray-Johnson, Highway Surveyor, Bentham, Lancaster.

JUNE 5.—**Rathdown.**—KITCHEN RANGES.—Rathdown No. 1 R.D.C. invite tenders for the supply of suitable kitchen ranges for some of the labourers' cottages in the district. Parties tendering must forward to the Workhouse, Loughlinstown, on or before June 4, a sample of the range.

* JUNE 5.—**West Ham.**—COAL AND COKE.—The County Borough of West Ham Council invite tenders for the supply of coal and coke to their Pumping Station, Abbey Mills; the Public Baths, Balaam-street; the Fever Hospital, Plaistow; and other departments within the Borough. For further particulars refer to an advertisement in this issue.

JUNE 6.—**Harrow.**—DUST-CART, ETC.—Harrow U.D.C. invite tenders for the supply of one dust-cart, one horse sweeping-machine. Specifications and details to be supplied with each tender. (Mr. John Strachan, Clerk, Council Offices.)

JUNE 10.—**Trimdon Grange.**—COLLIERY TIMBER.—Tenders are invited for the supply of all kinds of timber from July 1, 1907, to June 30, 1908. Forms of tender, with full conditions, may be obtained on application to the Storekeeper, Trimdon Grange Colliery, Co. Durham.

JUNE 12.—**Seghill.**—SCAVENGING.—Seghill U.D.C. invite tenders for the removal of ashes, etc., from the houses within the Seghill Urban District from July 1, 1907, to June 30, 1908. Particulars and conditions of contract can be obtained from Mr. Thomas Spencer, Clerk, Seghill, Northumberland.

## PAINTING, etc.

MAY 28.—**Leyton.**—PAINTING.—Leyton U.D.C. invite tenders for the painting work required to be done to the exterior of the Public Offices and Technical Institute, High-road and Adelaide-road, Leyton, and also at the Council's greenhouse in Oliver-road, Leyton. Specification and form of tender and other particulars may be obtained from Mr. Wm. Dawson, M.Inst.C.E., the Surveyor to the Council, at his offices, Town Hall, Leyton.

MAY 30.—**Manston.**—PAINTING.—Isle of Thanet Guardians invite tenders for painting at the Cottage Homes, Manston. Specifications may be seen at the Board-room, Minster, or at the Cottage Homes.

JUNE 3.—**Halifax.**—PAINTING.—Halifax Education Committee invite tenders for painting and colouring, limewashing, joiners, plumbers, and cement pointing work at the various schools, and raising boiler chimney at Queen's-road School. Plans and specifications may be seen, and forms of tender obtained, on application to Mr. James Lord, C.E., Borough Engineer, Town Hall, Halifax, on payment of the sum of 1*l.* for each set of quantities.

JUNE 4.—**Crigglestone.**—WHITEWASHING, ETC.—Whitewashing, painting, and papering of Curator's house and board-room at the Cemetery, Crigglestone. For particulars apply, Curator, Cemetery, Crigglestone.

JUNE 5.—**Lichfield.**—PAINTING.—Lichfield

Guardians invite tenders for painting and decorating required at their Infirmary and Observation Wards, Union Workhouse, Lichfield. Copies of the specification may be obtained, together with all necessary information, on application to Mr. R. J. Barnes, architect, City-chambers, Bore-street, Lichfield.

JUNE 8.—**Aberdeen.**—LIME-WASHING.—Aberdeen T.C. invite tenders for the lime-washing of courts and closes, of which a specification and list lie at the Sanitary Inspector's office, 41½, Union-street.

✱ JUNE 13.—**Kensington.**—PAINTING.—The Guardians of the Parish of Kensington invite tenders for painting a portion of the Infirmary, Marloes-road, Kensington. For further particulars refer to an advertisement in this issue.

✱ JUNE 17.—**West Ham.**—PAINTING, ETC., SCHOOLS.—The Education Committee of the County Borough of West Ham invite tenders for the cleansing, repairs, and painting of schools, to be executed during the summer vacation. For further particulars refer to an advertisement in this issue.

NO DATE.—**Salford.**—DECORATING, ETC., THEATRE.—The Directors of the Regent Theatre, Salford, invite tenders for decorating and cleaning the theatre, inside and out. For particulars apply at the theatre.

## ROADS, SANITARY, AND WATER WORKS.

MAY 27.—**Clay Cross.**—ROAD WORKS.—Clay Cross U.D.C. invite tenders for the re-making and repairing of roads in their district, the widening of Penlane, etc. Plans, specifications, and quantities, etc., may be inspected at the Council's Office, Clay Cross.

MAY 27.—**Wellington.**—PIPE SEWER.—Wellington U.D.C. invite tenders for the construction of a glazed pipe sewer, about 900 yds. in length. Plans and specifications may be seen at the Surveyor's Office, Wellington.

MAY 27.—**Wrexham.**—STREET IMPROVEMENT.—Wrexham Corporation invite tenders for carrying out a proposed improvement at the junction of Bradley-road and Regent-street. Drawings may be seen, and copies of specification, etc., obtained, on application to Mr. J. England, Borough Surveyor, Willow-road.

MAY 28.—**Burslem.**—UNDER-DRAINAGE.—Burslem Corporation invite tenders for under-draining two plots of land at the Borough Cemetery. Plans and specifications can be seen, and quantities obtained, at the Borough Surveyor's Office, Queen-street, on payment of 2*l.* 2s.

MAY 28.—**Gateshead.**—PAVING WORKS.—Gateshead Corporation invite tenders for paving Park-lane and a section of South Shore-road. Plans and specifications can be seen, and quantities obtained, at the office of N. P. Pattinson, Borough Surveyor, Town Hall.

MAY 28.—**Poole.**—SEWER.—For constructing about 770 yds. of sewer in Ringwood-road, Sea View-road, and Ashley-road. Particulars may be obtained on application to the Borough Surveyor, Mr. Samuel J. Newman, F.R.I.B.A., King-street, Poole.

MAY 29.—**Enfield.**—MAKING-UP.—The U.D.C. of Enfield invite tenders for making-up the private street known by the name of Wellington-road, Browning-road, Enfield. Plans and specifications can be seen, forms of tender, and all information obtained, on application to Mr. Richard Collins, the Council's Surveyor, Public Offices, Enfield.

MAY 29.—**Milton Abbey.**—CARRIAGE ROAD.—For the construction of 784 yds. or thereabouts of carriage road at Milton Abbey, near Blandford, in the county of Dorset, for Mr. E. A. Hambro. Copies of the plans, specification, and form of contract may be obtained on payment of 10s. 6d. from Mr. H. F. Stephens, A.M.Inst.C.E., Salford-terrace, Tonbridge, Kent.

MAY 30.—**Hackney.**—PAVING, ETC.—Hackney B.C. invite tenders for the execution of works of footway paving, kerbing, channelling, macadam carriage-way formation and metalling, granite sett carriage-way paving, and hardwood carriage-way paving which are required at High-street, Homerton, and Marsh-hill, eastward from Sidney-road, and at Sidney-road, southward from Marsh-hill. The general conditions of contract and the specification and plans and sections may be inspected, and copies of the bill of quantities and form of tender obtained, on application to Mr. Norman Scorgie, M.Inst.C.E., Borough Engineer and Surveyor, and on payment of the sum of 1*l.* 1s.

MAY 30.—**Sorn, Kilmarnock.**—WATERWORKS.—The Kilmarnock District Committee invite tenders for the construction of about fourteen miles of cast-iron pipes varying in size from 2 in. to 9 in. diameter, together with a small storage reservoir and catchwater drains, etc., and other contingent works. Plans can be seen at the office of Mr. John Sturrock, jun., civil engineer, 65, King-street, Kilmarnock, and copies of the specification, schedule, and tender can be obtained from him on payment of 1*l.*

MAY 31.—**Horbury.**—EXCAVATING, ETC.—Tenders are invited for labour only in excavating and filling trench, laying 4-in. drain pipes. For further particulars and copy of quantities apply, Mr. Arthur E. Radcliffe, engineer and surveyor, Horbury.

MAY 31.—**Horbury.**—SEWAGE WORKS.—The construction of additional settling tanks at the Sewage Works. For quantities and other information apply at the Town Hall, Horbury.

JUNE 3.—**Camberley.**—SEWAGE DISPOSAL.—Frimley U.D.C. invite tenders for the provision laying and jointing of about 800 yds. of 18-in., 15-in., and 12-in. stoneware socket pipes, and about 3,580 yds. of 6-in. and 4-in. agricultural drain pipes, etc. (Contract No. 3). Plans and specification may be seen, and bills of quantities with form of tender obtained, at the offices of the engineers, Messrs Willcox & Raikes, 63, Temple-row, Birmingham, on payment of a deposit of 3*l.* 3s. Plans and specification may also be seen at Camberley on application to Mr. F. W. Wright, Resident Engineer's Office, Sewage Disposal Works, Camberley, Surrey.

JUNE 3.—**Edinburgh.**—SEWER SHAFT, ETC.—Edinburgh Corporation invite tenders for the following work at M'Donald-road Electricity Supply Station:—Construction of sewer shaft and laying cast-iron pipe line for condensing water. The specification, form of tender, etc., can be obtained from the Engineer, Dewar-place Station, Edinburgh, on payment of a deposit of 2*l.* 2s. The specification, general conditions, and drawings can be seen at, but not obtained from, the office of Sir A. B. W. Kennedy, 17, Victoria-street, Westminster, London, S.W.

✱ JUNE 3.—**Edmonton.**—CONVENIENCE, ETC.—The Edmonton U.D.C. invite tenders for taking down the existing walls and fences on the north side of Angel-road and re-erecting and extending same; also for the erection of a public sanitary convenience (excluding sanitary fittings and plumbing work) and an electric light sub-station, adjoining Fore-street, Edmonton. For further particulars refer to advertisement in this issue.

JUNE 3.—**Loanhead.**—CONCRETE FOOT-PAVEMENTS.—The T.C. of the Burgh of Loanhead invite tenders for the construction of concrete foot-pavements within the Burgh. Drawings may be seen, and copies of specification, schedules, and form of tender may be obtained, at the office of Mr. George Somervel Carfrae, C.E., 1, Erskine-place, Edinburgh, on payment of 1*l.*

JUNE 4.—**Barton.**—WATER SUPPLY.—The R.D.C. of West Ward invite tenders for the following works:—Supplying about 410 tons of 4-in and 3-in. pipes and connexions; carting, laying, and jointing pipes (about eleven miles); supplying and fixing valves and hydrants, etc.; building service reservoir, collecting tank, chamber, and works at Head, all on Barton Fell. Plans, specifications, etc., may be seen at the office of the Engineer, Mr. George Watson, St. Andrew's-chambers, Penrith, who will supply copies of same, with schedule of quantities, etc., upon payment of 3*l.* 3s. (cheque only). The Engineer will meet intending contractors at his office on May 30 at 11.15 a.m.

✱ JUNE 4.—**Tottenham.**—TAR AND ASPHALT PAVING.—The Tottenham U.D.C. invite tenders for the repair of the tar and asphalt paving throughout their district. For further particulars refer to an advertisement in this issue.

JUNE 4.—**Wembdon.**—SEWERAGE.—Bridgwater R.D.C. invite tenders for laying of 1,468 lin. yds. of 6-in., 8-in., 9-in., and 12-in. stoneware pipe sewers, and 2,066 lin. yds. of 6-in. cast-iron pipe sewers, with the necessary manholes, ejector chambers, and engine-house, in accordance with the drawings, specifications, and instructions of their Engineer, Mr. W. Alex. Collins, Binford-place, Bridgwater. Drawings may be seen, and copies of the specification and bill of quantities obtained, at the R.D.C. Offices in Bridgwater on payment of 3*l.* 3s.

✱ JUNE 5.—**Kingston-on-Thames.**—ROAD-MAKING.—The Corporation of Kingston-on-Thames invite tenders for levelling, paving, metalling, flagging, channelling, and sewering Somerset-road and Linden-crescent respectively. For further particulars refer to an advertisement in this issue.

JUNE 7.—**Billington.**—SEWER.—Blackburn R.D.C. invite tenders for the construction of main sewers and two outfall sewage works:—(1) Langho scheme; and (2) Whalley End scheme. The general conditions of contract, etc., may be inspected, and copies of the bill of quantities and form of tender obtained, on application to Mr. Fred W. Duckworth, of Richmond-chambers, Blackburn, the Surveyor and Engineer of the Council, on payment of 2*l.* 2s.

JUNE 10.—**Clifton.**—PAVING, ETC.—The Main Roads and Bridges Committee invite tenders for the taking-up and repaving of about 10,000 yds. of old granite setts on the Manchester and Bolton main road in the township of Clifton. Specification and form of tender may be had on application to the County Surveyor, Mr. W. H. Schofield, County Offices, Preston.

JUNE 11.—**Barnes.**—PAVING.—The U.D.C. of Barnes invite tenders for paving the carriage-way of Castelnau, Barnes, an area of about 20,000 sq. yds., with jarrah wood blocks, laid on a concrete foundation. Plan, sections, and specification can be seen, and copies of the schedule and form of tender obtained, on application to the Engineer and Surveyor, at the Council House.

✱ JUNE 11.—**Willesden.**—CONVENIENCE.—The Willesden D.C. invite tenders for supply and erection of an "above ground" convenience at Church End, Willesden. For further particulars refer to an advertisement in this issue.

## STONE, MATERIALS, AND STORES.

MAY 27.—**Feltham.**—ROAD MATERIAL.—Feltham Works Committee invite tenders for the supply of about 500 tons of granite (*a*) 1 in. to 1½ in., and (*b*) 2 in. Forms of tender may be obtained from the Council's Surveyor, Mr. R. T. Stewart, Town Hall Chambers, Feltham.

MAY 27.—**London.**—STORES.—The Great Northern Railway Company Directors invite tenders for the supply of certain new and the purchase of old stores for twelve months from July 1 next. A list of the contracts, and separate forms of tender for each contract, may be obtained upon application to Mr. Weeks, the Stores Superintendent, Doncaster.

MAY 28.—**Acton.**—TAR-PAVING MATERIALS AND WOOD BLOCKS.—Acton D.C. invite tenders for the supply of tar-paving material and new creosoted deal wood blocks. Forms of tender can be seen at 57, High-street, Acton, during office hours.

MAY 28.—**Beaconsfield.**—FLINTS.—The U.D.C. of Beaconsfield invite tenders for the supply of hand-picked flints (200 yds. required; no one tender to be for less than 50 yds.). Further particulars can be obtained on application to Mr. Herbert Watson, surveyor, Beaconsfield.

MAY 28.—**Brentford.**—GRANITE.—Brentford U.D.C. invite tenders for the supply of 150 yds. of blue Guernsey granite, hand broken to a gauge of 2 in. Forms of tender, together with specification and conditions, may be obtained on application, personally, to Mr. Nowell Parr, the Surveyor, at his office, Clifden House, Boston-road, Brentford.

MAY 28.—**Edmonton.**—GRANITE KERB.—Edmonton U.D.C. invite tenders for the supply and delivery of about 1,060 lin. ft. of straight and about 180 ft. of circular 12 in. by 8 in. Norway granite kerb; also tenders for the supply and delivery of about 1,540 super. yds. of concrete or artificial stone paving, and for alternative tenders for the supply, delivery, and laying of the concrete or artificial stone paving in Bury-street, Victoria-road, and Windmill-road, in the district of Edmonton. Forms of tender and full particulars may be had on application to Mr. G. Eedes Eachus, Engineer to the Council.

✱ MAY 28.—**Ryde.**—CAST-IRON PIPES, ETC.—The Ryde T.C. invite tenders for the supply and delivery of about 850 yds. of 9-in., 270 yds. of 5-in., and 200 yds. of 3-in. cast-iron pipes, with valves, hydrants, and other castings. For further particulars refer to an advertisement in this issue.

MAY 29.—**Rickmansworth.**—CAST-IRON PIPES, ETC.—Rickmansworth U.D.C. invite tenders for the supply of about 7,570 yds. of 6-in. cast-iron pipes, and about 4,470 yds. of 4-in. pipe (spigot and socket), preferably in 12-ft. lengths, also specials and siphons. Specifications may be had of Mr. H. Lomas, Clerk to the Council. The Gas Committee also invite tenders for the supply at Rickmansworth Station of about 9 tons of lead of the very best quality, of English manufacture.

MAY 29.—**Rushden.**—GRANITE AND SLAG.—Rushden U.D.C. invite tenders for the supply of granite and slag during the ensuing year. Specification and forms of tender may be obtained on application to Mr. W. B. Madin, C.E., Engineer and Surveyor, Council Buildings, Rushden, Northants.

MAY 29.—**Soyland.**—KERBSTONES, ETC.—Soyland U.D.C. invite tenders for the supply of about 250 yds. of 12 by 8 dressed kerbstones and 270 yds. of good, sound 3-in. riven flags, to be delivered in Halifax-road, near Kebroyd Bridge; also the squaring and laying of the above flags and kerbstones. Further particulars may be had from Mr. John Wadsworth, Surveyor, Council Offices, Ripponden.

MAY 29.—**Walton-on-Thames.**—BROKEN GRANITE.—The U.D.C. invite tenders for the supply of 1,200 tons of 1½-in. broken granite. Specification and form of tender may be obtained on application to Mr. R. Wilds, Surveyor, Council Offices, Walton-on-Thames.

MAY 30.—**London.**—DEAL BLOCKS.—St. Pancras Highways, Sewers, and Public Works Committee invite tenders for the supply of about 150,000 creosoted deal blocks in strict accordance with the conditions of the specification to be used in repaving portions of Pancras-road, Mecklenburgh-street, and Heathcote-street. Official forms can be obtained on application to Mr. Wm. N. Blair, M.Inst.C.E., Borough Engineer and Surveyor.

MAY 30.—**London.**—JARRAH TIMBER.—Lambeth B.C. invite tenders for the supply of 1,150 loads of West Australian Jarrah timber. Terms and particulars to be obtained upon application to Mr. Henry Edwards, C.E., Borough Engineer, at No. 346, Kennington-road, S.E. Forms to be obtained from the Borough Engineer.

MAY 30.—**Oundle.**—MATERIALS.—Oundle U.D.C. invite tenders for granite and slag. Forms of tender may be obtained on application to Mr. Robert Knight, Clerk to the said Council, New-street, Oundle.

MAY 30.—**South Stoneham.**—GRANITE AND FLINTS.—South Stoneham R.D.C. invite tenders for the supply of about 1,300 tons of either of the following stones:—Best blue Guernsey granite, Cherbourg quartzite, Cornish syenite or basalt, flints. Forms of tender may be obtained at office of Mr. E. T. Westlake, Clerk, 20, Portland-street, Southampton, or of the District Surveyor, Mr. W. J. Potter, "Glenroy," Portswood, Southampton.

MAY 31.—**Brighton.**—CEMENT.—Brighton Corporation invite tenders for the supply of Portland cement for the year ending June 30, 1908. The specification and form of tender may be obtained on application at the office of the Borough Surveyor, at the Town Hall, Brighton.

JUNE 1.—**Cramlington.**—WHINSTONE.—Cramlington U.D.C. invites tenders for (1) supply of 1,500 tons, more or less, of broken whinstone, delivered as required to Cramlington Station and dam dykes siding; (2) hire of steam-roller and water-cart; (3) the carting of whinstone from Cramlington and dam dykes on to the Council's roads. Specifications, form of tender, etc., may be obtained from Mr. Wm. I. Coulson, Surveyor, Council Office, Cramlington.

JUNE 3.—**Great Driffield.**—WHINSTONE.—The U.D.C. of Great Driffield invite tenders for the supply of 1,000 tons, or less quantity at the option of the Council, of unbroken whinstone, delivered carriage paid at Driffield Railway Station. Payments monthly. Tenders, stating price per ton, to be delivered to Mr. Geo. B. Tonge, Clerk, Great Driffield. The persons tendering to also state their price for whinstone broken (2½ in.) by machinery, and also broken by hand.

JUNE 3.—**Nelson.**—PIPES.—Nelson Water Committee invite tenders for 1,720 yds. of 14-in., 400 yds. of 4-in., and 300 yds. of 3-in. cast-iron pipes and irregular pipes. Particulars may be obtained on application to Mr. Jas. Hartley, Waterworks Manager, Town Hall, Nelson.

JUNE 3.—**Orsett.**—ROAD MATERIAL.—Orsett R.D.C. invite tenders for the supply of 800 tons 2-in. granite, 1,200 cubic yds. 2-in. quartzite, 950 cubic yds. Kentish flints, and 700 cubic yds. 2½ Kentish rag-stone. Forms of tender can be obtained from Mr. F. T. Johnson, Highway Surveyor, 2, Orsett-road, Grays.

JUNE 3.—**Tyldesley-with-Shakerley.**—STORES.—The U.D.C. invite tenders for delivery at the Gas-works, Tyldesley, from July 1 next to June 30, 1908, cast-iron spigot and socket pipes (gas and water); lead tubing (tinned) (gas and water); pig lead; best Buxton lime (Gasworks and Sewage Works); gas meters, ordinary and automatic. Further particulars and forms of tender may be obtained on application to Mr. W. J. Matthews, Clerk to the Council, Council Offices, Tyldesley.

JUNE 4.—**Aldershot.**—ROAD MATERIALS.—Aldershot U.D.C. invite tenders for materials. Forms of tender will be supplied for tarmac, basalt, and flints. Mr. Fred. C. Uren, District Surveyor

JUNE 4.—**London.**—ROAD STONE.—Great Western Railway Directors invite tenders for the supply of machine-broken road stone and stone chippings. Conditions of contract and forms of tender may be obtained on application to Mr. G. K. Mills, Secretary, Paddington Station, London.

JUNE 5.—**Manchester.**—DRAIN PIPES.—The Cleansing Committee of the Manchester Corporation invite tenders for twelve months' supply of agricultural drain pipes. Specifications may be obtained upon application to Mr. R. Williamson, Superintendent of the Cleansing Department, Town Hall, Manchester.

JUNE 6.—**Penrhiwceiber.**—STORES.—The Penrikyber Navigation Colliery Company, Ltd., Penrhiwceiber, R.S.O., Glam., invite tenders for iron and steel, castings, bolts, etc. Forms of tender may be obtained on application to the Secretary.

JUNE 7.—**Valletta.**—CHANNELS AND SLABS.—Tenders will be received at the office of the Receiver General and Director of Contracts, Valletta, up to 11 a.m. on June 7 for the supply of stoneware straight channels and slabs. Tenders are to be accompanied with a deposit of 30*l.*, to be made in the office of the Crown Agents, by tenderers residing in Great Britain not having a representative in Malta. Particulars, specification, etc., may be obtained on application at office to the Crown Agents for the Colonies, Whitehall-gardens, London.

JUNE 8.—**Cardiff.**—STORES.—Cardiff Corporation invite tenders from Cardiff tradesmen for the supply of stores for the Police and Fire Brigade Departments for twelve months. Forms of tender may be obtained at the Head-constable's Office, Law Courts.

JUNE 8.—**Oswestry.**—SUPPLIES.—Cambrian Railways Directors invite tenders for supplies of stores. Specifications and forms of tender may be obtained at the Stores Office, Cambrian Works, Oswestry, and specimens, patterns, and samples may be seen there daily, except on Saturdays, from 9 a.m. to 4 p.m.

JUNE 10.—**Ely.**—BROKEN GRANITE.—Ely U.D.C. invite tenders for supply and delivery at Ely Railway Station of 400 tons (more or less) of 1½ in. to 1⅝ in. Clee Hill, blue Guernsey, or Leicestershire granite (separate prices for machine and hand broken to be quoted), and 100 tons (more or less) of best Clee Hill, blue Guernsey, or Leicestershire 1-in. clean screenings. Also 20 tons (more or less) of 1⅝ in. similar granite to Black Bank Station (G.E.R.). Also 200 tons (more or less) of 1½ in. similar granite (separate prices for machine and hand broken to be quoted). Samples of each should be sent to Mr. W. McKelvie, at the City Surveyor's Office, in Ely (carriage paid).

JUNE 11.—**Hetton.**—ROAD MATERIALS.—The U.D.C. of Hetton invite tenders for supplying road materials. Further particulars, together with form of tender, may be obtained from the Surveyor of the Council, Mr. John Harding, Hetton-le-Hole, R.S.O., to whom samples of slag proposed to be supplied are to be sent.

JUNE 27.—**Marlow.**—FLINTS.—Marlow U.D.C. invite tenders for the supply of hand-picked field flints. Mr. Ll. Shone, Clerk to the Council, High-street, Marlow.

## Public Appointment.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in |
|---|---|---|---|
| *TEMPORARY ARCHITECTURAL ASSISTANT | Glamorgan County Council | 2*l.* 10*s.* per week | June 8 |

## Auction Sales.

| Nature and Place of Sale. | By whom Offered. | Date of Sale. |
|---|---|---|
| *FREEHOLD ESTATE, BROXBOURNE—Bull Hotel, Hoddesdon | Bridgman & Son | May 28 |
| *CONTRACTOR'S STOCK, MACHINERY, ETC., MANSFIELD—On the Premises | Galbraith, Bethune, & Co., Ltd. | May 28, etc. |
| *DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C. | Churchill & Sims | May 29 |
| *BLDRS.' AND CABINET-MAKERS' TIMBER STOCK—At Timber Yd., Bethnal Gr. Jun., E. | W. F. Laing | do. |
| *FREEHOLD BUILDING SITE, BLACKFRIAR'S-ROAD, S.E.—At the Mart | Edwin Fox & Bousfield | do. |
| *FREEHOLD RESIDENTIAL ESTATE, NORTHWOOD—At the Mart | Daniel Watney & Sons | May 31 |
| *FREEHOLD BUILDING LAND AND RESIDENCE, NORTHWOOD—At the Mart | Daniel Watney & Sons | do. |
| *BUILDING LAND, MITCHAM AND CROYDON—At the Mart | Daniel Watney & Sons | do. |
| *CORNER SITE, CITY OF LONDON—At the Mart | Daniel Watney & Sons | do. |
| *FREEHOLD PREMISES, FULHAM—At the Broadway, Walham Green | Binns & Douglas | June 3 |
| *FREEHOLD PROPERTY, SLOANE-STREET, S.W.—At the Mart | M. Newton | June 5 |
| *TIMBER, HAMPSTEAD-ROAD, N.W.—On the Premises | Joseph Hibbard & Sons | June 6, etc. |
| *FREEHOLD BUILDING SITE, HAMMERSMITH—At the Mart | Matthews, Matthews, & Goodman | June 10 |
| *IRONMONGERS' STOCK, 95, UPPER THAMES-STREET, E.C.—On the Premises | Walton & Lee | June 11 |
| *FREEHOLD ESTATE, HERTFORDSHIRE—At the Mart | Edwin Fox & Bousfield | June 12 |
| *CORNER BUILDING SITE, SOHO-SQUARE, W.—At the Mart | Garrett, White, & Poland | June 19 |
| *FREEHOLD BUILDING SITES, 48 AND 50, WORSHIP-ST., 14, DYSART-ST.—At the Mart | David Burnett & Co. | do. |
| *FREEHOLD ESTATE, MILL HILL, HENDON—At the Mart | Edwin Fox & Bousfield | do. |
| *FREEHOLD PROPERTY, MARYLEBONE-ROAD, W.—At the Mart | Elliott, Son, & Boyton | June 24 |

### SOME RECENT SALES OF PROPERTY:
### ESTATE EXCHANGE REPORT.

By NORFOLK & PRIOR (at Catford).

| | |
|---|---|
| 23, Lewisham-pk., u.t. 67 yrs., g.r. 12*l.*, e.r. 60*l.* | £470 |
| 46, Culverley-rd., f., y.r. 50*l.* | 700 |
| Brownhill-rd., freehold building plot, 140 ft. | 710 |
| Brownhill-rd., freehold building plot, 125 ft. | 580 |
| 112, Rushey-green, lease and business, u.t. 43 yrs., 35*l.* and 40*l.* y.r. | 700 |

May 8.—By SEDGWICK, SON, & WEALL (at Pinner).

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|---|---|
| Pinner, Middlesex.—Harrow and Marsh rds., 21 plots of building land, f. | 1,501 |

May 10.—By GEORGE LOVEITT & SONS (at Coventry).

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|---|---|
| Stretton-on-Dunsmore, Warwick.—Seven enclosures of land, f., 35 acres | 1,520 |
| Napton, Warwick.—Freehold land, 7 acres | 310 |
| Coventry, Warwick.—27, Little Pk.-st., factory, etc., f., w.r. 101*l.* 13*s.* | 1,000 |
| 71 and 73, Harnall-la. East, f., w.r. 39*l.* | 520 |

By PERKINS & SONS (at Southampton).

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|---|---|
| Southampton.—12, Cumberland-pl., f., y.r. 85*l.* | 1,350 |

By NICHOLAS, DENYER, & CO. (at Tunbridge Wells).

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|---|---|
| Rotherfield, Sussex.—Freehold s. and building plot | 770 |
| Long croft meadow and two cottages, 2 a. 0 r. 25 p., f. | 605 |

May 13.—By WM. HOUGHTON.

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|---|---|
| Chingford.—Tewardstone-rd., "The Firs," f., p. | 750 |
| Leyton, Essex.—High-st., building site, f., p. | 250 |
| Park-rd. and Church-rd., building land, f., p. | 650 |

By VERYARD & YATES.

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|---|---|
| Walworth.—273, Albany-rd. (s.), f., y.r. 40*l.* | 670 |

By T. B. WESTACOTT.

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|---|---|
| Leytonstone.—26, Cann Hall-rd., f., y.r. 28*l.* | 400 |
| Camden Town.—23, Crowndale-rd., u.t. 36 yrs., g.r. 6*l.*, e.r. 55*l.* | 465 |

May 14.—By DRIVERS.

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|---|---|
| Highgate.—86 and 92, Dartmouth Pk.-hill, u.t. 69 yrs., g.r. 10*l.* 10*s.*, w.r. 78*l.* | 500 |
| Holloway.—3 and 4, Carville-st., f., w.r. 78*l.* | 560 |

By FAREBROTHER, ELLIS, & CO.

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|---|---|
| Surrey—Shere and Ewhurst.—"Coverwood House Estate," f., 231 a. 0 r. 3 p. | 12,000 |

By REYNOLDS & EASON.

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|---|---|
| Barnsbury.—7, 10, 11, 31, 32, and 33, Offord-st., u.t. 31 yrs., g.r. 8*l.*, w.r. 215*l.* 16*s.* | 905 |
| Covent Garden.—20, New-st., f., w.r. 95*l.* | 1,910 |

By FREDERICK WARMAN.

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|---|---|
| Hoxton.—27, Wimborne-st., 42, 44, and 46, Cropley-st., u.t. 32 yrs., g.r. 36*l.*, w.r. 104*l.* | 200 |
| Islington.—11, Cloudesley-st., u.t. 9½ yrs., g.r. 8*l.*, y.r. 38*l.* | 100 |

WOODS & SNELLING.

| | |
|---|---|
| Kent—New Eltham.—Westbrooke Nurseries, f., y.r. 40*l.*, 1 a. 2 r. 17 p. | 500 |

PERKIN & SONS (at Southampton).

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|---|---|
| Southampton.—Union-rd., etc., f.g. rents 44*l.* 1*s.* | £961 |
| 125, Payne's-rd., p., y.r. 50*l.* | 950 |

WINCH & SONS (at Ashford).

| | |
|---|---|
| Woodchurch, Kent.—Shirley Moor Estate 232 a. 0 r. 15 p., f. | 5,750 |

LANGRIDGE & FREEMAN (at Tonbridge).

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|---|---|
| Tonbridge, Hayesden.—Four freehold cottages, w.r. 41*l.* 12*s.* | 510 |

May 15.—By ALLAN BOOTH.

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|---|---|
| Stroud Green.—1, Beatrice-rd., u.t. 89 yrs., g.r. 9*l.*, p. | 390 |

By G. ERNEST CLARKE.

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|---|---|
| Walthamstow.—108, Belgrave-rd., f., w.r. 27*l.* 6*s.* | 250 |

By HUMBERT & FLINT.

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|---|---|
| Nutfield, Surrey.—"Hall Lands," f., 5 a. 0 r. 20 p., p. | 1,750 |
| Two enclosures of freehold land, cottage, etc., 13 a. 1 r. 21 p., y.r. 40*l.* | 970 |

By ORGILL, MARKS, & BARLEY.

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|---|---|
| Ventnor, Isle of Wight.—The "Royal Hotel," f., goodwill and possession | 11,800 |

By H. E. FOSTER & CRANFIELD.

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|---|---|
| Rayleigh, Essex.—Dawes Heath, "Laneside," f., y.r. 36*l.*, 26 a. 0 r. 11 p. | 560 |
| Enfield.—Carterhatch-la., Irkdale Nurseries, f., y.r. 40*l.*, 1 a. 1 r. 16 p. | 450 |

By TOPLIS & HARDING.

| | |
|---|---|
| Deptford.—38 and 40, High-st. (s.), f., y.r. 71*l.* | 1,820 |
| Greenwich.—Diamond-ter., f.g.r. 20*l.*, reversion in 11¼ yrs. | 500 |

By WESTMORE & YOUNG.

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|---|---|
| Norwood.—5, Highview-rd., u.t. 82 yrs., g.r. 11*l.* 10*s.*, y.r. 48*l.* | 250 |

By JAMES T. PEAT (at Redhill).

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|---|---|
| Redhill.—Upper Bridge-rd., "Belle Vue" and "Waverley," f., y.r. 66*l.* | 750 |
| 18 and 20, Ridgeway-rd., f., y.r. 58*l.* | 830 |
| Meadvale-Somerset-rd., "Ingleside," f., w.r. 26*l.* | 350 |
| 92 and 92A, Monson-rd., f., w.r. 44*l.* 4*s.* | 500 |

May 16.—By B. R. BOSTOCK.

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|---|---|
| Forest Gate.—208, Boleyn-rd., f., w.r. 31*l.* 4*s.* | 300 |
| Stratford.—Broad-st., l.g. rents 12*l.*, reversion in 59 yrs. | 270 |
| East Ham.—292, Shrewsbury-rd., f., y.r. 60*l.* | 1,150 |
| 5, Chester-rd., f., y.r. 35*l.* | 550 |

By BOWDITCH & GRANT.

| | |
|---|---|
| Notting Hill.—62, Acklam-rd., u.t. 59 yrs., g.r. 8*l.*, w.r. 70*l.* 4*s.* | 285 |

By BROWETT & TAYLOR.

| | |
|---|---|
| Ealing.—1, Inglis-rd., u.t. 81 yrs., g.r. 8*l.* 8*s.*, e.r. 65*l.* | 600 |
| Hampton Wick.—Kingston-rd., Lindum Villa, u.t. 64 yrs., g.r. 12*l.*, e.r. 45*l.* | 200 |

By HAMILTON, BRAGG, & CO.

| | |
|---|---|
| Fulham.—41, Victoria-rd., u.t. 46½ yrs., g.r. 5*l.*, w.r. 52*l.* | 240 |

By HILARY & CO.

| | |
|---|---|
| Wanstead.—Douglas House, f., e.r. 108*l.* | 1,050 |

By MIDDLETON & CRACKNELL.

| | |
|---|---|
| Watford, Herts.—203, St. Alban's-rd. (s.), f., y.r. 45*l.* | £700 |

By NEWBON, SHEPHARD, & EDWARDS.

| | |
|---|---|
| Kensington.—Eldon-rd., i.g.r. 28*l.* 16*s.*, u.t. 25 yrs., g.r. nil | 385 |
| Catford.—121 to 129 (odd), Brookdale-rd.; and 106, 108, and 110, Silvermere-rd., u.t. 88½ yrs., g.r. 40*l.*, w.r. 284*l.* 14*s.* | 1,315 |
| Holloway.—Parkhurst-rd., f.g. rents 23*l.*, reversion in 38½ yrs. | 900 |
| Caledonian-road.—Bingfield-st., etc., l.g. rents 75*l.*, u.t. 33½ yrs., g.r. 14*l.* | 820 |

By ROBINS & HINE.

| | |
|---|---|
| West Brompton.—Finborough-rd., "The Finborough Arms," profit rental of 103*l.*, u.t. 58 yrs. with reversion | 1,500 |

By STIMSON & SONS.

| | |
|---|---|
| Poplar.—Aberfeldy-st., f.g. rents 69*l.* 15*s.*, reversion in 55 yrs. | 1,195 |
| Peckham.—East Surrey-gr., f.g. rents 15*l.* 13*s.*, reversion in 19 and 21 yrs. | 650 |
| Walworth.—Wadding-st., f.g.r. 21*l.*, reversion in 52 yrs. | 500 |
| Leyton.—Sidmouth-rd., f.g. rents 27*l.*, reversion in 73 yrs. | 585 |
| Battersea.—Creek-st., f.g. rents 13*l.* 15*s.*, reversion in 20 yrs. | 600 |
| Clapham.—Rodenhurst-rd., freehold plot of land | 320 |
| East Barnet.—Cat Hill, "Cat Cottage," f. | 100 |
| Wandsworth.—25, Tonsley-rd., u.t. 56 yrs., g.r. 3*l.* 3*s.*, w.r. 27*l.* 12*s.* | 175 |
| Woolwich.—30, Church-st., (s.), f., y.r. 20*l.* | 325 |

May 17.—By BARNARD & CO.

| | |
|---|---|
| Richmond.—28, Pagoda-av., u.t. 86 yrs., g.r. 7*l.* 10*s.*, y.r. 36*l.* | 340 |

By BUNCH & DUKE.

| | |
|---|---|
| Clapton.—12, Lockhurst-st., u.t. 70½ yrs., g.r. 5*l.*, e.r. 45*l.* | 335 |

*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold, p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

## MEETINGS.

FRIDAY, MAY 24.

*Royal Institution.*—Professor J. A. Fleming, M.A., on "Recent Contributions to Electric Wave Telegraphy." 9 p.m.

SATURDAY, MAY 25.

*Edinburgh Architectural Association.*—Visit to Dalkeith Palace and Chapel.

MONDAY, MAY 27.

*Royal Institute of British Architects.*—Sir H. Tanner, I.S.O., to present the Provisional Report of the Joint Reinforced Concrete Committee. 8 p.m.

TUESDAY, MAY 28.

*Royal Institute of British Architects.*—On the requisition under By-law 60 of Messrs. James S. Gibson, H. V. Lanchester, E. A. Rickards, W. G. Wilson, Alfred W. S. Cross, C. E. Mallows, Herbert Read, R. Falconer MacDonald, Herbert W. Wills, C. E. Hutchinson, John Anderson, and J. R. Best, a special general meeting will be held. (*a*) To consider the conditions and instructions issued by the London County Council governing the competition for a new county hall (and any replies to competitors forming part of such conditions). (*b*) To consider any action taken by the Institute Council with reference to the initiation, conduct, conditions, and instructions of the competition. (*c*) To propose any resolutions which may arise out of the subjects or matters dealt with under Clauses (*a*) and (*b*). 8 p.m.

*Society of Arts (Applied Art Section).*—Mr. Sherard Cowper-Coles on "Sheffield Plate and Electro-plate." 8 p.m.

WEDNESDAY, MAY 29.

*Royal Sanitary Institute.*—Discussion on "Suggested Amendments of the London County Council By-laws as to Drainage." 8 p.m.

THURSDAY, MAY 30.

*London County Council School of Building (Ferndale-road, Brixton).*—Professor Beresford Pite on the Architecture of London (Ancient and Modern)—II. "Mediæval London: the Temple Church; St. Bartholomew's, Smithfield; Southwark Cathedral; the Tower, etc." 7.30 p.m.

*Royal Institution.*—Professor Sir J. Dewar, M.A., on "Chemical Progress—Work of Mendeleeff and Moissan"—II. 3 p.m.

*Society of Arts (Indian Section).*—Mr. Laurence Robertson, I.C.S., on "Irrigation Colonies in India." 4.30 p.m.

FRIDAY, MAY 31.

*Royal Sanitary Institute.*—Discussion on Infantile Mortality, at the Western Law Courts, Guildhall, Plymouth. 7.30 p.m.

SATURDAY, JUNE 1.

*Architectural Association.*—Third summer visit to East Grinstead.


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# PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

## BRICKS, &c.

| | £ s. d. | |
|---|---|---|
| Hard Stocks | 1 7 0 | per 1000 alongside, in river. |
| Rough Stocks and Grizzles | 1 6 0 | ,, ,, ,, |
| Picked Stocks for Facings | 2 10 0 | ,, delivered. |
| Flettons | 1 6 0 | ,, at railway depôt. |
| Red Wire Cuts | 1 14 0 | ,, ,, ,, |
| Best Fareham Red | 3 12 0 | ,, ,, ,, |
| Best Red Pressed Ruabon Facing | 5 0 0 | ,, ,, ,, |
| Best Blue Pressed Staffordshire | 3 15 0 | ,, ,, ,, |
| Do. Bullnose | 4 0 0 | ,, ,, ,, |
| Best Stourbridge Fire Bricks | 3 14 0 | ,, ,, ,, |
| GLAZED BRICKS. | | |
| Best White and Ivory Glazed Stretchers | 12 0 0 | ,, ,, ,, |
| Headers | 11 0 0 | ,, ,, ,, |
| Quoins, Bullnose, and Flats | 16 0 0 | ,, ,, ,, |
| Double Stretchers | 19 0 0 | ,, ,, ,, |
| Double Headers | 16 0 0 | ,, ,, ,, |
| One Side and two Ends | 19 0 0 | ,, ,, ,, |
| Two Sides and one End | 20 0 0 | ,, ,, ,, |
| Splays, Chamferred, Squints | 20 0 0 | ,, ,, ,, |
| Best Dipped Salt Glazed Stretchers, and Header | 12 0 0 | ,, ,, ,, |
| Quoins, Bullnose, and Flats | 14 0 0 | ,, ,, ,, |
| Double Stretchers | 15 0 0 | ,, ,, ,, |
| Double Headers | 14 0 0 | ,, ,, ,, |
| One Side and two Ends | 15 0 0 | ,, ,, ,, |
| Two Sides and one End | 15 0 0 | ,, ,, ,, |
| Splays, Chamferred, Squints | 14 0 0 | ,, ,, ,, |
| Second Quality White and Dipped Salt Glazed | 2 0 0 | ,, less than best. |

| | s. d. | |
|---|---|---|
| Thames and Pit Sand | 7 0 | per yard, delivered. |
| Thames Ballast | 5 6 | ,, ,, |
| Best Portland Cement | 28 0 | per ton, ,, |
| Best Ground Blue Lias Lime | 19 0 | ,, ,, |

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

## STONE.

| | s. d. | |
|---|---|---|
| BATH STONE—delivered on road waggons, Paddington Depôt | 1 6½ | per ft. cube. |
| Do. do. delivered on road waggons, Nine Elms Depôt | 1 8½ | ,, ,, |
| PORTLAND STONE (20 ft. average)— | | |
| Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf | 2 1 | ,, ,, |
| White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf | 2 2½ | ,, ,, |

| | s. d. | |
|---|---|---|
| Ancaster in blocks | 1 10 | per ft. cube, deld. rly. depôt |
| Beer ,, | 1 6 | ,, ,, |
| Greenshill ,, | 1 10 | ,, ,, |
| Darley Dale in blocks | 2 4 | ,, ,, |
| Red Corsehill ,, | 2 2 | ,, ,, |
| Closeburn Red Freestone | 2 0 | ,, ,, |
| Red Mansfield ,, | 2 4 | ,, ,, |
| YORK STONE—*Robin Hood Quality.* | | |
| Scappled random blocks | 2 10 | ,, ,, |
| 6 in. sawn two sides landings to sizes (under 40 ft. super.) | 2 3 | per ft. super., ,, |
| 6 in. rubbed two sides ditto, ditto | 2 6 | ,, ,, |
| 3 in. sawn two sides slabs (random sizes) | 0 11½ | ,, ,, |
| 2 in. to 2½ in. sawn one side slabs (random sizes) | 0 7½ | ,, ,, |
| 1½ in. to 2 in. ditto, ditto | 0 6 | ,, ,, |
| HARD YORK— | | |
| Scappled random blocks | 3 0 | per ft. cube, ,, |
| 6 in. sawn two sides landings to sizes (under 40 ft. super.) | 2 8 | per ft. super. ,, |
| 6 in. rubbed two sides ditto | 3 0 | ,, ,, |
| 3 in. sawn two sides slabs (random sizes) | 1 2 | ,, ,, |
| 2 in. self-faced random flags | 0 5 | ,, ,, |

## SLATES.

| In. In. | £ s. d. | |
|---|---|---|
| 20×10 best blue Bangor | 13 2 6 | per 1000 of 1200 at r. d. |
| 20×12 ,, ,, | 13 17 6 | ,, ,, |
| 20×10 first quality ,, | 13 0 0 | ,, ,, |
| 20×12 ,, ,, | 13 15 0 | ,, ,, |
| 16×8 ,, ,, | 7 5 0 | ,, ,, |
| 20×10 best blue Portmadoc | 12 12 6 | ,, ,, |
| 16×8 ,, ,, | 6 12 6 | ,, ,, |
| 20×10 best Eureka unfading green | 15 17 6 | ,, ,, |
| 20×12 ,, ,, | 18 7 6 | ,, ,, |
| 18×10 ,, ,, | 13 5 0 | ,, ,, |
| 16×8 ,, ,, | 10 5 0 | ,, ,, |
| 20×10 permanent green | 11 12 6 | ,, ,, |
| 18×10 ,, ,, | 9 12 6 | ,, ,, |
| 16×8 ,, ,, | 6 12 6 | ,, ,, |

## TILES.

| | s. d. | |
|---|---|---|
| Best plain red roofing tiles | 42 0 | per 1000 at rly. depôt |
| Hip and Valley tiles | 3 7 | per doz. ,, |
| Best Broseley tiles | 50 0 | per 1000 ,, |
| Do. Ornamental tiles | 52 6 | ,, ,, |
| Hip and Valley tiles | 4 0 | per doz. ,, |
| Best Ruabon red, brown, or brindled do. (Edwards) | 57 6 | ,, ,, |
| Do. Ornamental do. | 60 0 | ,, ,, |
| Hip tiles | 4 0 | per doz. ,, |
| Valley tiles | 3 0 | ,, ,, |
| Best Red or Mottled Staffordshire do. (Peakes) | 51 9 | per 1000 ,, |
| Do. Ornamental do. | 54 6 | ,, ,, |
| Hip tiles | 4 1 | per doz. ,, |
| Valley tiles | 3 8 | ,, ,, |
| Best "Rosemary" brand plain tiles | 48 0 | per 1000 ,, |
| Best Ornamental tiles | 50 0 | ,, ,, |
| Hip tiles | 4 0 | per doz. ,, |
| Valley tiles | 3 8 | ,, ,, |
| Best "Hartshill" brand plain tiles, sand-faced | 50 0 | per 1000 ,, |
| Do. pressed | 47 6 | ,, ,, |
| Do. Ornamental do. | 50 0 | ,, ,, |
| Hip tiles | 4 0 | per doz. ,, |
| Valley tiles | 3 6 | ,, ,, |

## WOOD.

| BUILDING WOOD. | At per standard. £ s. d. | £ s. d. |
|---|---|---|
| Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in. | 13 10 0 | ... 15 0 0 |
| Deals: best 3 by 9 | 13 0 0 | ... 14 0 0 |
| Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in. | 11 0 0 | ... 12 0 0 |
| Battens: best 2½ by 6 and 3 by 6 | 0 10 0 | less than 7 in. and 8 in. |
| Deals: seconds | 1 0 0 | less than best. |
| Battens: seconds | 0 10 0 | ,, ,, |
| 2 in. by 4 in. and 2 in. by 6 in. | 9 0 0 | ... 10 0 0 |
| 2 in. by 4½ in. and 2 in. by 5 in. | 8 10 0 | ... 9 10 0 |
| Foreign Sawn Boards— | | |
| 1 in. and 1¼ in. by 7 in. | 0 10 0 | more than battens. |
| ¾ in. | 1 0 0 | ,, |
| | At per load of 50 ft. | |
| Fir timber: best middling Danzig or Memel (average specification) | 4 10 0 | ... 5 0 0 |
| Seconds | 4 0 0 | ... 4 10 0 |
| Small timber (8 in. to 10 in.) | 3 12 6 | ... 3 15 0 |
| Small timber (6 in. to 8 in.) | 3 0 0 | ... 3 10 0 |
| Swedish balks | 2 10 0 | ... 3 0 0 |
| Pitch-pine timber (30 ft. average) | 4 0 0 | ... 4 15 0 |
| JOINERS' WOOD. | At per standard. | |
| White Sea: first yellow deals, 3 in. by 11 in. | 24 0 0 | ... 25 0 0 |
| 3 in. by 9 in. | 22 0 0 | ... 23 0 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 16 10 0 | ... 18 0 0 |
| Second yellow deals, 3 in. by 11 in. | 18 10 0 | ... 20 0 0 |
| ,, 3 in. by 9 in. | 17 10 0 | ... 19 0 0 |
| ,, Battens, 2½ in. and 3 in. by 7 in. | 13 10 0 | ... 14 10 0 |
| Third yellow deals, 3 in. by 11 in. and 9 in. | 13 10 0 | ... 15 0 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 11 0 0 | ... 12 0 0 |
| Petersburg first yellow deals, 3 in. by 11 in. | 21 0 0 | ... 22 10 0 |
| Do. 3 in. by 9 in. | 18 0 0 | ... 19 10 0 |
| Battens | 13 10 0 | ... 15 0 0 |

## WOOD (*continued*).

| JOINERS' WOOD (*continued*)— | At per standard. £ s. d. | £ s. d. |
|---|---|---|
| Second yellow deals, 3 in. by 11 in. | 16 0 0 | ... 17 0 0 |
| Do. 3 in. by 9 in. | 14 10 0 | ... 16 0 0 |
| Battens | 11 0 0 | ... 12 10 0 |
| Third yellow deals, 3 in. by 11 in. | 13 0 0 | ... 14 0 0 |
| Do. 3 in. by 9 in. | 12 10 0 | ... 14 0 0 |
| Battens | 10 0 0 | ... 11 0 0 |
| White Sea and Petersburg— | | |
| First white deals, 3 in. by 11 in. | 14 10 0 | ... 15 10 0 |
| ,, ,, 3 in. by 9 in. | 13 10 0 | ... 14 10 0 |
| Battens | 11 0 0 | ... 12 0 0 |
| Second white deals, 3 in. by 11 in. | 13 10 0 | ... 14 10 0 |
| ,, ,, 3 in. by 9 in. | 12 10 0 | ... 13 10 0 |
| ,, ,, battens | 10 0 0 | ... 11 0 0 |
| Pitch-pine: deals | 18 0 0 | ... 21 0 0 |
| Under 2 in. thick extra | 0 10 0 | ... 1 0 0 |
| Yellow Pine—First, regular sizes | 44 0 0 | upwards. |
| Oddments | 32 0 0 | ,, |
| Seconds, regular sizes | 33 0 0 | ,, |
| Yellow Pine oddments | 28 0 0 | ,, |
| Kauri Pine—Planks, per ft. cube | 0 3 6 | ... 0 5 0 |
| Danzig and Stettin Oak Logs— | | |
| Large, per ft. cube | 0 3 0 | ... 0 3 6 |
| Small ,, ,, | 0 2 6 | ... 0 2 9 |
| Wainscot Oak Logs, per ft. cube | 0 5 6 | ... 0 6 0 |
| Dry Wainscot Oak, per ft. sup. as inch | 0 0 8½ | ... 0 0 9½ |
| ¾ in. do. do | 0 0 7 | ... — |
| Dry Mahogany—Honduras, Tabasco, per ft. super. as inch | 0 0 9 | ... 0 1 0 |
| Selected, Figury, per ft. super. as inch | 0 1 6 | ... 0 2 6 |
| Dry Walnut, American, per ft. super. as inch | 0 0 10 | ... 0 1 0 |
| Teak, per load | 17 0 0 | ... 22 0 0 |
| American Whitewood Planks, per ft. cube | 0 4 0 | ... 0 5 0 |
| Prepared Flooring, etc.— | Per square. | |
| 1 in. by 7 in. yellow, planed and shot | 0 13 6 | ... 0 17 6 |
| 1 in. by 7 in. yellow, planed and matched | 0 14 0 | ... 0 18 0 |
| 1¼ in. by 7 in. yellow, planed and matched | 0 16 0 | ... 1 0 0 |
| 1 in. by 7 in. white, planed and shot | 0 12 0 | ... 0 14 6 |
| 1 in. by 7 in. white, planed and matched | 0 12 6 | ... 0 15 0 |
| 1¼ in. by 7 in. white, planed and matched | 0 15 0 | ... 0 16 6 |
| ¾ in. by 7 in. yellow, matched and beaded or V-jointed brds. | 0 11 0 | ... 0 13 6 |
| 1 in. by 7 in. ,, ,, | 0 14 0 | ... 0 18 0 |
| ¾ in. by 7 in. white ,, ,, | 0 10 0 | ... 0 11 6 |
| 1 in. by 7 in. ,, ,, ,, | 0 12 9 | ... 0 15 0 |

6 in. at 6d. to 9d. per square less than 7 in.

## JOISTS, GIRDERS, &c.

| | In London, or delivered Railway Vans, per ton. £ s. d. | £ s. d. |
|---|---|---|
| Rolled Steel Joists, ordinary sections | 7 7 6 | ... 7 15 0 |
| Compound Girders, ordinary sections | 9 10 0 | ... 10 10 0 |
| Steel Compound Stanchions | 12 5 0 | ... 13 5 0 |
| Angles, Tees, and Channels, ordinary sections | 9 5 0 | ... 10 5 0 |
| Flitch Plates | 9 5 0 | ... 10 5 0 |
| Cast Iron Columns and Stanchions including ordinary patterns | 8 0 0 | ... 9 0 0 |

## METALS.

| IRON— | Per ton, in London. £ s. d. | £ s. d. |
|---|---|---|
| Common Bars | 8 10 0 | ... 9 0 0 |
| Staffordshire Crown Bars, good merchant quality | 9 5 0 | ... 9 15 0 |
| Staffordshire "Marked Bars" | 11 0 0 | ... — |
| Mild Steel Bars | 9 10 0 | ... 9 15 0 |
| Hoop Iron, basis price | 9 15 0 | ... 10 0 0 |
| ,, Galvanised | 17 10 0 | ... — |
| (*And upwards, according to size and gauge.) | | |
| Sheet Iron Black— | | |
| Ordinary sizes to 20 g. | 10 0 0 | ... — |
| ,, ,, 24 g. | 11 0 0 | ... — |
| ,, ,, 26 g. | 12 10 0 | ... — |
| Sheet Iron, Galvanised, flat, ordinary quality— | | |
| Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g. | 16 0 0 | ... — |
| Ordinary sizes to 22 g. and 24 g. | 16 10 0 | ... — |
| ,, ,, 26 g. | 17 0 0 | ... — |
| Sheet Iron, Galvanised, flat, best quality— | | |
| Ordinary sizes to 20 g. | 19 0 0 | ... — |
| ,, ,, 22 g. and 24 g. | 19 10 0 | ... — |
| ,, ,, 26 g. | 21 0 0 | ... — |
| Galvanised Corrugated Sheets— | | |
| Ordinary sizes 6 ft. to 8 ft. 20 g. | 16 0 0 | ... — |
| ,, ,, 22 g. and 24 g. | 16 5 0 | ... — |
| ,, ,, 26 g. | 17 10 0 | ... — |
| Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker | 13 0 0 | ... — |
| Best Soft Steel Sheets, 22 g. & 24 g. | 14 0 0 | ... — |
| ,, ,, ,, 26 g. | 16 0 0 | ... — |
| Cut Nails, 3 in. to 6 in. | 10 15 0 | ... 11 5 0 |
| (Under 3 in., usual trade extras.) | | |

## LEAD, &c.

| | Per ton, in London. £ s. d. | £ s. d. |
|---|---|---|
| LEAD—Sheet, English, 3lb. and up. | 23 0 0 | ... — |
| Pipe in coils | 23 10 0 | ... — |
| Soil pipe | 25 10 0 | ... — |
| Compo pipe | 26 10 0 | ... — |
| ZINC—Sheet— | | |
| Vieille Montagne ton | 33 5 0 | ... — |
| Silesian | 33 0 0 | ... — |
| COPPER— | | |
| Strong Sheet per lb. | 0 1 4 | ... — |
| Thin ,, ,, | 0 1 5 | ... — |
| Copper nails ,, | 0 1 3 | ... — |
| BRASS— | | |
| Strong Sheet ,, | 0 1 2 | ... — |
| Thin ,, ,, | 0 1 3 | ... — |
| TIN—English Ingots ,, | 0 1 11 | ... — |
| SOLDER—Plumbers' ,, | 0 0 9 | ... — |
| Tinmen's ,, | 0 0 11 | ... — |
| Blowpipe ,, | 0 1 1 | ... — |

**ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.**

| | | |
|---|---|---|
| 15 oz. thirds | 2½d. | per ft. delivered. |
| ,, fourths | 1⅞d. | ,, ,, |
| 21 oz. thirds | 3⅛d. | ,, ,, |
| ,, fourths | 2⅜d. | ,, ,, |
| 26 oz. thirds | 4⅛d. | ,, ,, |
| ,, fourths | 3⅛d. | ,, ,, |
| 32 oz. thirds | 5d. | ,, ,, |
| ,, fourths | 4⅛d. | ,, ,, |
| Fluted Sheet, 15 oz. | 3⅛d. | ,, ,, |
| ,, 21 oz. | 4⅛d. | ,, ,, |

**ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.**

| | | |
|---|---|---|
| ¼ Hartley's | 2½d. | per ft. delivered. |
| ⅛ ,, | 2⅝d. | ,, ,, |
| ⅛ ,, | 3d. | ,, ,, |
| Figured and Oxford Rolled "Oceanic" Glass, white ... | 4d. | ,, ,, |
| Do. ,, tinted ... | 5½d. | ,, ,, |

| OILS, &c. | | £ s. d. |
|---|---|---|
| Raw Linseed Oil in pipes | per gallon | 0 2 2 |
| ,, ,, ,, in barrels | ,, | 0 2 3 |
| ,, ,, ,, in drums | ,, | 0 2 5 |
| Boiled ,, ,, in pipes | ,, | 0 2 4 |
| ,, ,, ,, in barrels | ,, | 0 2 5 |
| ,, ,, ,, in drums | ,, | 0 2 6 |
| Turpentine in barrels | ,, | 0 4 3 |
| ,, in drums | ,, | 0 4 7 |
| Genuine Ground English White Lead | per ton | 26 0 0 |
| Red Lead, Dry | ,, | 24 10 0 |
| Best Linseed Oil Putty | per cwt. | 0 7 0 |
| Stockholm Tar | per barrel | 1 12 0 |

| VARNISHES, &c. | Per gallon. £ s. d. |
|---|---|
| Fine Pale Oak Varnish | 0 8 0 |
| Pale Copal Oak | 0 10 6 |
| Superfine Pale Elastic Oak | 0 12 6 |
| Fine Extra Hard Church Oak | 0 10 0 |
| Superfine Hard-drying Oak, for seats of Churches | 0 14 0 |
| Fine Elastic Carriage | 0 12 6 |
| Superfine Pale Elastic Carriage | 0 16 0 |
| Fine Pale Maple | 0 16 0 |
| Finest Pale Durable Copal | 0 18 0 |
| Extra Pale French Oil | 1 1 0 |
| Eggshell Flatting Varnish | 0 18 0 |
| White Copal Enamel | 1 4 0 |
| Extra Pale Paper | 0 12 0 |
| Best Japan Gold Size | 0 10 6 |
| Best Black Japan | 0 16 0 |
| Oak and Mahogany Stain | 0 9 0 |
| Brunswick Black | 0 8 6 |
| Berlin Black | 0 16 0 |
| Knotting | 0 10 0 |
| French and Brush Polish | 0 10 0 |

## TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ANGMERING.—For additions, etc., at the Infectious Ward at the East Preston Workhouse, for the Guardians. Mr. H. M. Potter, architect, 41, Warwick-street, Worthing:—

| | | | |
|---|---|---|---|
| H. C. Child & Son | £181 18 | E. Farmer & Sons | £145 13 |
| G. Baker, jun. | 162 10 | H. Bennett* | 110 0 |
| A. F. Clark | 148 10 | | |

[All of Worthing.]

BARNET.—For the erection of a residence at Hadley Green, for Mrs. Mercer. Messrs. White, Son, & Pill, architects, 13 and 15, High-street, Barnet:—

| | | | |
|---|---|---|---|
| A. Fairhead & Son | £2,415 0 | R. Williams | £2,079 0 |
| Wallis & Co., Ltd. | 2,250 0 | S. Worboys | 1,977 0 |
| Baughen Bros. | 2,242 10 | Pearson & Son | 1,969 12 |
| F. & G. Foster | 2,181 0 | Fitch & Cox | 1,937 0 |
| J. Baughen | 2,164 0 | W. H. Sharpe, Barnet* | 1,875 0 |

BENFIELDSIDE.—For paving part of Wood-street, Shotley Bridge, for the Urban District Council. Mr. T. Knox, Surveyor, Council Offices, Bank-buildings, Shotley Bridge:—

| | | | |
|---|---|---|---|
| T. Gallacher | £398 15 | R. McLaren, Stocks-field-on-Tyne* | £330 0 |
| J. Westgarth | 385 0 | | |
| E. Taylor | 371 5 | | |

CHARD.—For ten cottages, Perry-street, for Mr. C. E. Small, Perry-street, Chard. Messrs. Symes & Madge, architects, Chard. Quantities by architects:—

| | | | |
|---|---|---|---|
| T. Munford | £2,921 6 6 | Bishop & Son | £2,215 14 6 |
| J. Perkins | 2,571 0 0 | Harris & Woolcott | 2,211 18 0 |
| G. Hallet | 2,534 18 6 | C. Bryer, jun. | 2,170 0 0 |
| Reileen & Griffiths | 2,299 0 0 | Parsons Bros. & Dunster, Chard* | 2,111 0 0 |
| Spiller & Son | 2,280 0 0 | | |
| Bazley & Smith | 2,250 0 0 | | |

CRAIGCEFNPARC (Wales).—For erecting a vestry for the Independent Chapel Committee. Mr. J. Cook Rees, architect, Neath:—

| | | | |
|---|---|---|---|
| J. Howills | £354 | J. Arnold | £324 |
| Walters & Johns | 350 | Williams Bros | 320 |
| J. A. Williams, Craig Cefu Park* | 326 | | |

DUNDEE.—For heating offices at West Bell-street, for Dundee Combination Parish Council. Mr. T. Martin Cappon, F.R.I.B.A., 32, Bank-street, Dundee:—

| | | | |
|---|---|---|---|
| Davidson & Son | £383 10 0 | D. Keay | £321 0 0 |
| J. Boyd & Son | 345 18 10 | Taylor & Fraser | 306 9 5 |
| R. Tindall | 339 17 6 | G. H. Nicoll & Co. | 290 17 0 |
| J. Keith & Blackman, Ltd. | 335 15 4 | F. H. Rowlett | 288 1 1 |
| Mackenzie & Moneur | 335 3 0 | A. L. Peacock & Co., Dundee* | 284 0 0 |

FELINNEWYDD.—For iron and steel work, for the iron bridge to be erected across the River Rheidol at Felinnewydd, Cwmrheidol, for Aberystwyth Rural District Council:—

| | | | |
|---|---|---|---|
| Drew-Bear, Perks, & Co. | £136 5 | T. Williams & Sons | £85 0 |
| Lambourne & Co | 129 0 | E. C. & J. Keay, Ltd., Birmingham* | 67 0 |
| G. Thompson & Co. | 112 10 | | |

FENTON (Staffs.).—For builders' work for underground conveniences in Victoria-place, for the Urban District Council. Mr. S. A. Goodall, Surveyor, Town Hall, Fenton:—

| | | | |
|---|---|---|---|
| Cox & Underhill | £437 11 | Sanders & Torrance, Hanley* | £352 0 |
| Tompkinson & Bettelley | 357 0 | | |

FERRYBRIDGE.—For alterations to the Greyhound Inn, for Messrs. the Carters' Knottingley Brewery Company, Ltd. Messrs. Garside & Pennington, architects and surveyors, Pontefract and Castleford:—

| | | | |
|---|---|---|---|
| Gelder Bros. & Woodcock | £465 6 | Walker & Ward | £140 0 |
| J. H. Austerberry | 461 19 | W. Thompson & Son, Sherburn. South Milford* | 400 0 |

HEMSWORTH.—For 189 six-roomed dwelling-houses, at Hemsworth Collieries, near Wakefield, for the South Kirkby, Featherstone, and Hemsworth Collieries, Ltd. Messrs. Garside & Pennington, architects and surveyors, Pontefract and Castleford:—

| | | | |
|---|---|---|---|
| G. Mellor | £41,692 0 | Gallagher Bros. | £39,527 0 |
| Bramham & Sons | 41,669 0 | Bagnall Bros. | 39,406 0 |
| F. W. Denholme & Co. | 41,404 0 | F. H. & I. W. Moore | 39,205 0 |
| W. Hanley | 41,595 0 | J. Charters | 36,888 15 |
| J. Pullan | 41,296 0 | G. W. Meanley | 36,249 9 |
| Walker & Roe | 40,866 0 | P. Rhodes, Skinner-lane, Leeds* | 36,021 0 |
| Thorpe & Beddard | 40,000 0 | | |

HEREFORD.—For erecting factory at Hereford, for Messrs. Greenlands, Ltd. Messrs. Groome & Bettington, architects and surveyors, Palace-chambers, Hereford:—

| | | | |
|---|---|---|---|
| Humpheys, Ltd. | £970 0 0 | Alexander & Duncan | £725 0 0 |
| Bellow & Sons | 925 0 0 | Redpath, Brown, & Co. | 715 0 0 |
| J. Harrison & Co. | 880 0 0 | G. P. Banbury* | 705 10 0 |
| W. Harbrow | 868 0 0 | Baldwins, Ltd. ‡ | 574 7 6 |
| Blakeley & Co. | 822 2 6 | Ginger, Lee, & Co. § | 135 0 0 |
| Rowell & Co. | 752 0 0 | | |
| Hill & Smith | 736 0 0 | | |

‡ Ironwork only. § Stable only.

ILMINSTER.—For building an extension to the Rose Mills, for the Chard Lace Company, Ltd. Messrs. Symes & Madge, architects and surveyors, Chard. Quantities by architects:—

| | | | |
|---|---|---|---|
| T. Bishop | £750 0 | Reileen & Griffiths | £550 0 |
| W. Coombes | 693 12 | J. Layzell | 540 10 |
| Parsons Bros. & Dunster | 637 10 | A. Poole, Ilminster* | 537 0 |
| H. J. Spiller & Son | 570 0 | | |

LONDON.—For rebuilding of 85, Hatton-garden, for Mr. G. Blizard. Messrs. Joseph & Smithem, architects:—

| | | | |
|---|---|---|---|
| Patman & Fotheringham | £2,600 | W. Shepherd | £2,487 |
| Hudson Bros. | 2,549 | Seneca! & Co. | 2,565 |
| | | W. Smith* | 2,433 |

LONDON.—For the supply of Jarrah wood blocks, for the Borough Council of Southwark:—

Millars-Karri & Jarrah Company (1902), Ltd., 72. Bishopsgate-street Within, E.C.* £5 13s. per 1,000 (3 in. by 5 in. by 4½ in.), for about 614,000.

[Other tenders for blocks of different dimensions.]

LONDON.—For the erection of Brantome-place dwellings, for St. Pancras Borough Council. Messrs. Joseph & Smithem, architects, 83, Queen-street, Cheapside, E.C.:—

| | |
|---|---|
| J. Appleby & Sons | £20,653 0 0 |
| Waring White Building Co. | 20,456 0 0 |
| J. E. Johnson & Son | 20,385 0 0 |
| Foster & Dicksee | 20,200 0 0 |
| J. Parnell & Sons | 19,927 0 0 |
| H. Watson | 19,900 0 0 |
| J. Smith & Sons | 19,777 0 0 |
| Harris & Wardrop | 19,563 0 0 |
| Thompson Bros. | 19,400 0 0 |
| Todd & Newman | 19,271 0 0 |
| S. E. Moss & Co. | 19,197 8 0 |
| F. J. Coxhead | 19,022 0 0 |
| Patman & Fotheringham | 19,000 0 0 |
| F. & T. Thorne | 18,987 0 0 |
| McCormick & Sons | 18,957 0 0 |
| F. & G. Foster | 18,912 0 0 |
| Perry & Co. | 18,842 0 0 |
| G. Godson & Son | 18,797 0 0 |
| W. Johnson & Co. | 18,760 0 0 |
| F. & H. F. Higgs | 18,542 0 0 |
| G. E. Wallis & Sons | 18,540 0 0 |
| B. E. Nightingale | 18,496 0 0 |
| W. Lawrence & Son | 18,484 0 0 |
| W. Pattinson & Sons | 18,443 0 0 |
| C. Wall & Co. | 18,313 0 0 |
| Spencer, Santo, & Co. | 18,284 0 0 |
| F. & E. Davey | 18,222 0 0 |
| Killby & Gayford, Ltd. | 17,927 0 0 |
| Bailey & Fry | 17,838 0 0 |
| W. Moss & Sons | 17,580 0 0 |
| E. J. Clayton | 17,570 0 0 |
| H. L. Holloway, Union Works, Deptford, S.E. ‡ | 17,479 0 0 |
| A. N. Coles | 17,466 17 6 |
| J. Guttridge | 16,990 0 0 |
| *For the Artificial Stonework of the Buildings.* | |
| The Empire Stone Co., Ltd | 1,868 18 3 |
| J. Bickley ‡ | 1,776 16 0 |
| E. Tatham & Co. | 1,699 0 0 |
| Lasceiles & Co. | 1,689 0 0 |
| *For the Ironwork of the Buildings.* | |
| W. Macfarlane | 967 0 0 |
| D. King | 679 8 0 |
| The Falkirk Iron Co. | 659 10 11 |
| Yates, Haywood, & Co. | 656 11 0 |
| Hawkins & Baxter ‡ | 545 0 0 |

‡ Recommended.

LONDON.—For the erection of new warehouses Bethnal Green, E., for Messrs. Allen & Hanbury, Ltd. Mr. P. K. Allen, architect, Tunbridge Wells; Mr. S. Cecil Addison, surveyor, 29, Baronsfield-road, St. Margarets-on-Thames:—

| — | Contract No. 1. | Contract No. 2. | Total. |
|---|---|---|---|
| | £ | £ | £ |
| McCormick & Sons | 5,854 | 3,486 | 9,340 |
| Treasure & Son | 5,762 | 3,362 | 9,124 |
| Dove Bros., Ltd. | 5,842 | 3,246 | 9,088 |
| E. Lawrance & Sons | 5,562 | 3,284 | 8,846 |
| F. & F. J. Wood | 5,524 | 3,302 | 8,826 |
| J. Jarvis & Sons | 5,540 | 3,200 | 8,740 |
| Perry & Co. | 5,641 | 2,990 | 8,631 |
| J. Chessum & Sons | 5,589 | 3,024 | 8,613 |
| J. Greenwood, Ltd. | 5,276 | 2,847 | 8,123 |
| J. Grover & Son* | 5,258 | 2,814 | 8,072 |

LONDON.—For engine foundations and builders' work in connexion with the installation of generating plant, for the Hackney Borough Council. Mr. H. Mair, M.I.C.E., Borough Surveyor, Town Hall, Hackney:—

| | |
|---|---|
| T. W. Pedrette | £2,380 0 0 |
| W. Silk & Son | 2,333 0 0 |
| F. & T. Thorne | 2,150 0 0 |
| Barrett & Power | 2,100 12 3 |
| W. Neil & Co. | 2,098 10 0 |
| W. Shurmer & Sons | 2,097 0 0 |
| J. A. Ewart | 2,025 10 8 |
| A. Hood | 1,997 0 0 |
| A. Weibking & Co. | 1,989 14 2 |
| A. N. Coles | 1,929 0 0 |
| J. & C. Bowyer, Upper Norwood, S.E. ‡ | 1,796 0 0 |
| Abbott & Charlton | 1,641 6 4 |
| Abbott, Heinrich, & Co. | 1,629 13 11 |

‡ Recommended.

ISLINGTON.—For laying 2,030 super. yds. of slag tar-macadam in Mentone-road and Kelvin-road, for the Borough Council. Mr. J. Patten Barber, Borough Engineer, Town Hall, Upper-street, N.:—

| — | Tender No. 1. For laying the macadam and maintaining for a period of one year. | Tender No. 2. For maintaining the macadam for a further period of three years. At per yard super. per annum. | | | Total amount of tenders. |
|---|---|---|---|---|---|
| | £ s. d. | s. d. | | £ s. d. | £ s. d. |
| J. Smart & Son | 507 10 0 | 0 8 | = | 203 0 0 | 710 10 0 |
| J. Edge & Co. | 253 15 0 | 1 0 | = | 304 10 0 | 558 5 0 |
| Atkins & Co. | 395 8 6 | 0 3 | = | 76 2 6 | 471 11 0 |
| Constable, Hart, & Co., Ltd. | 380 12 6 | 0 3 | = | 76 2 6 | 456 15 0 |
| W. Shepherd & Sons | 338 6 8 | 0 4 | = | 101 10 0 | 439 16 8 |
| Tarmac, Ltd., 20, Victoria-street, S.W.* | 380 12 6 | 0 2 | = | 50 15 0 | 431 7 6 |

LONDON.—For alterations and improvements at 37, Beech-street, Barbican, for Messrs. Ingram, Perkins, & Company. Messrs. Joseph & Smithem, architects :—

| | | | |
|---|---|---|---|
| Mason & Co. | £1,415 | Senecal & Co. | £1,090 |
| T. Sobey | 1,229 | Lascelles & Co* | 1,027 |
| Harrison & Spooner | 1,134 | | |

LONDONDERRY.—For building sanitary annexes on the male and female sides of the workhouse, for the Guardians. Mr. M. A. Robinson, C.E., Richmond-street, Derry :—

*Building.*

| | | | |
|---|---|---|---|
| M. Sweeney | £239 | Crookes & Ferguson | £190 18 6 |
| J. M'Bride | 228 | E. Hughes, Farney-terrace, Derry* | 170 0 0 |
| Shamon & Rutledge | 217 | | |
| R. Colhoun | 210 | | |

*Plumbing.*

| | | | |
|---|---|---|---|
| G. Burns | £89 17 6 | J. M'Clean, Little James-street, Derry* | £78 12 |
| W. Shannon | 88 0 0 | | |
| H. M'Mahon | 85 0 0 | | |
| J. Donaghey | 79 10 0 | | |

MANCHESTER.—For foundation of new sorting-office, Newton-street for the Commissioners of H.M. Works and Public Buildings :—

| | | | |
|---|---|---|---|
| W. A. Peters & Sons | £1,956 0 0 | W. Storrs, Sons & Co., Ltd. | £1,329 0 0 |
| B. Morton | 1,488 0 0 | R. Neill & Sons | 1,168 0 0 |
| L. Marr & Son | 1,390 0 0 | W. Brown & Sons | 1,167 0 0 |
| | | E. Nuttall & Co.* | 1,054 1 7 |

NEW BARNET.—For New Barnet Telephone Exchange :—

| | | | |
|---|---|---|---|
| Jarman, Daws, & Co. | £3,887 | H. W. Parker & Son | £3,507 |
| Spencer, Santo, & Co., Ltd. | 3,757 | W. Irwin | 3,365 |
| Galbraith Bros. | 3,750 | Patman & Fotheringham, Ltd. | 3,273 |
| F. & A. Willmott | 3,607 | Hyde & Co. | 3.155 |
| J. Christie | 3,597 | J. Behrend | 3,136 |
| W. Butcher | 3,588 | F. & G. Foster | 3,042 |
| F. & H. F. Higgs | 3,540 | Edwards & Medway | 2,989 |

NORTHWOOD. — For 700 yds. of 9-in. stoneware pipe sewer, for the Ruislip-Norwood Urban District Council. Mr. W. Louis Carr, Surveyor, Council Offices, Northwood, Middlesex :—

| | | | |
|---|---|---|---|
| T. Free & Sons | £1,601 0 0 | R. W. Swaker | £961 19 10 |
| Neave & Nairn | 1,247 0 0 | Johnson & Langley | 953 16 8 |
| W. Neave & Son | 1,181 0 0 | G. Mann | 899 0 0 |
| J. Pitkin | 1,066 8 0 | A. F. Lee | 849 15 6 |
| Willis & Powis | 998 19 0 | W. Halsey & Son | 732 3 0 |
| G. Bell & Sons, Ltd. | 989 0 0 | F. Hoffman | 688 15 1 |
| Langley & Johnson | 982 13 6 | T. Watson, jun., Southall, Middlesex | 625 0 0 |
| A. B. Champnis | 976 9 0 | | |

PONTEFRACT.—For female ward and alterations to buildings at the General Dispensary. Messrs. Garside & Pennington, architects and surveyors, Pontefract and Castleford :—

| | | | |
|---|---|---|---|
| H. Gundill* | £397 11 0 | T. W. Senior* | £26 0 0 |
| Gelder Bros. & Woodcock* | 164 16 0 | Stewart Bros.* | 15 0 0 |
| W. H. Keighley* | 97 6 9 | S. Harrison* | 12 3 0 |

[All of Pontefract.]

SOUTHAMPTON. — For erecting a new Inland Revenue Office, for the Commissioners of H.M. Works and Public Buildings :—

| — | Portland. | | Bath. | | Credit. | |
|---|---|---|---|---|---|---|
| | £ | s. | £ | s. | £ | s. |
| Golding & Ansell | 6,135 | 0 | 5,713 | 0 | 103 | 0 |
| S. Salter | 5,929 | 0 | 5,673 | 0* | 195 | 0 |
| Jenkins & Sons, Ltd. | 6,180 | 0 | 5,765 | 0 | 220 | 0 |
| A. S. Cooke | 6,298 | 0 | 5,857 | 0 | 120 | 0 |
| H. Jones | 6,319 | 0 | 6,047 | 0 | 135 | 0 |
| F. Osman | 6,401 | 0 | 5,925 | 0 | 25 | 0 |
| H. Willcock & Co. | 6,467 | 0 | 5,937 | 0 | 50 | 0 |
| H. Stevens & Co. | 6,570 | 0 | 6,220 | 0 | 120 | 0 |
| Dyer & Sons | 6,572 | 0 | 6,119 | 0 | 5 | 0 |
| H. Cawte | 6,649 | 10 | 6,173 | 10 | 31 | 5 |
| Stevens, Bastow, & Co., Ltd. | 6,894 | 0 | 6,495 | 0 | 101 | 15 |
| W. R. Light & Son | 6,577 | 0 | 6,149 | 0 | 180 | 0 |
| E. Walters & Son | 6,590 | 0 | 6,067 | 0 | 67 | 0 |
| Wakeham & Sons | 6,774 | 0 | 6,375 | 0 | 50 | 0 |
| Bagshaw & Sons | 6,970 | 0 | 7,496 | 0 | 102 | 5 |
| G. J. Britten | 7,076 | 0 | 6,660 | 0 | 15 | 0 |
| J. Nichol | 7,096 | 0 | 6,288 | 0 | 40 | 0 |

SHOEBURYNESS.—For a two-lift gasholder, for the Urban District Council. Mr. Harold A. Harris, Engineer, Southend :—

S. Cutler & Sons, Millwall, E.* ..... £1,434

THORNBURY.—For the erection of works for Shackleton's Tube Company, Ltd. Mr. E. H. Parkinson, architect, Queen's-gate-chambers, Bradford. Quantities by architect :—

| | | |
|---|---|---|
| *Excavators, Masons, and Bricklayers :* Norrington & Proctor, Bradford | £469 | 0 0 |
| *Carpenter and Joiner :* I. Tayler, Lees, Keighley | 369 | 0 0 |
| *Plumbers and Glaziers :* Collinson & Lord, Bradford | 146 | 1 7 |
| *Slater :* W. Nelson, Bradford | 60 | 0 0 |
| *Plasterers :* T. Bolton & Son, Bradford | 22 | 0 0 |
| *Painter :* W. Farrer, Laisterdyke | 6 | 18 0 |

TRAWSFYNYDD.— For ventilating, painting, and general repairs necessary to Moriah C.M. Chapel and Schoolroom, Trawsfynydd, Merionethshire. Mr. R. Lloyd Jones, architect, 14, Market-street, Carnarvon, and at Pwllheli :—

| | |
|---|---|
| R. Williams & Son | £329 0 |
| J. O. Thomas | 280 9 |
| W. Lewis & W. Jones | 269 0 |
| E. Jones F.I.B.D., 32, Bedford-street North, Liverpool * ‡ | 268 0 |

‡ Decorating, painting, etc., £138. General repairs, ventilating, etc., £130.

WARWICK.—For the erection and completion of two houses in Cape-road, Warwick. Mr. C. M. C. Armstrong, architect, Warwick :—

| | | | |
|---|---|---|---|
| T. Cashmore | £1,600 0 0 | Sheashy & Hobbis | £1,368 17 8 |
| J. H. Cashmore | 1,519 18 11 | Kelley & Sons | 1,311 17 0 |
| W. Moss & Co. | 1,490 0 0 | T. Bailey, Leamington† | 1,276 0 0 |
| G. F. Smith & Sons | 1,440 0 0 | | |
| R. Bowen | 1,397 0 0 | | |

WEYMOUTH.—For erecting bakery and stabling, 50, Dorchester-road, for Messrs. Cornick Bros. Mr. S. Jackson, architect and surveyor, Bridge-chambers, Weymouth :—

| | | | |
|---|---|---|---|
| F. Selby | £472 0 0 | W. Long | £420 0 0 |
| Jesty & Baker | 465 0 0 | J. T. Wills, Weymouth* | 385 0 0 |
| A. J. Colborne | 425 11 8 | | |

WIDEMARSH.—For new offices, for Messrs. Evans & Co., Widemarsh. Messrs. Groome & Bettington, architects and surveyors, Palace-chambers, Hereford :—

| | | | |
|---|---|---|---|
| W. P. Lewis & Co. | £298 | E. W. Wilks | £275 |
| C. Cooke | 278 | Beavan & Hodges* | 264 |

[All of Hereford.]


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and milk-
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LANE, E.C.
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SCULPTURE AT THE PARIS SALON.

"LE PELERIN DE LA VIE": BY M. HIPPOLYTE ROUSSEL.

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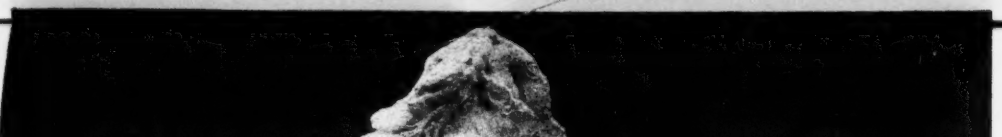
"ROMÉO ET JULIETTE": BY M. HENRI A. CARLI.

"CARMEN": BY M. CHARLES VINCENT.



"ROMÉO ET JULIETTE": BY M. HENRI A. CARLI.

"CARMEN": BY M. CHARLES VINCENT.

"EVE": BY M. FRANÇOIS SICARD.

"LA JEUNESSE ENTRE L'AMOUR ET L'AMITIÉ": BY M. EMILE BOISSEAU.
*(Salon of 1906.)*

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SCULPTURE AT THE PARIS SALON

The Porch

The Vestibule

The Hall Corridor

# PORCH·AND·INTERIORS·OF·HOUSE KENSINGTON·PALACE·GARDENS Mr. E·J·MAY· F·R·I·B·A· ARCHITECT

The Vestibule

The Hall Corridor

PHOTO-LITHO. SPRAGUE & Co Ltd 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

The Hall Fireplace

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THE HALL, IN HOUSE, KENSINGTON PALACE GARDENS.—Mr. E. J. May, F.R.I.B.A., Architect.